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Atty. Docket No.: 11111/1210 PATENT

AF/1600

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Segal	Examiner:	Belyavskyi, M
Serial No.:	09/318,870		
Filed:	May 26, 1999	Group Art Unit:	1644
Entitled:	Cytokine Coated Cells and Methods for Modulating an Immune Response to an Antigen		
		Conf. No.:	2018

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TRANSMITTAL LETTER

Enclosed for filing in the above-identified patent application, please find the following documents:

1. Appeal Brief in triplicate;
2. Supplemental Documents in triplicate;
3. Return Post Card.

The Commissioner for Patents is hereby authorized to charge any additional fees or credit any overpayment in the total fees to Deposit Account No. 16-0085, Reference No. 11111/1210. A duplicate of this transmittal letter is enclosed for this purpose.

Respectfully submitted,

Date: March 25, 2004

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Atty. Docket No.: 11111/1210 **PATENT**

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APPEAL BRIEF UNDER 37 C.F.R. §1.192

Sir:

This Appeal Brief is submitted pursuant to the Notice of Appeal, mailed January 30, 2004, from the Examiner's final rejection of claims 1-8, 13, 14, 17-20, and 22-25, mailed January 8, 2004 in the above-referenced application.

Applicants also submit concurrently herewith, an After Final amendment to the claims, which Applicant believes, when taken in combination with the arguments of record and the submissions below, place the claims in condition for allowance.

Each of the requirements set forth in 37 C.F.R. § 1.192(c) follow under separate headings.

Real Party in Interest

The real party in interest in the above captioned patent application is the assignee, Genitrix, LLC, by virtue of an assignment document dated 6/30/99, and recorded at Reel: 010074, Frame: 0546.

Related Appeals and Interferences

There are no related appeals or interferences in this case.

Status of Claims

Claims 1-8, 13, 14, 17-20, and 22-25 stand finally rejected and are the subject of this appeal. A copy of these claims can be found in Appendix I, attached. They do not reflect the proposed amendments as set forth in the Amendment After Final Rejection submitted herewith. Claims 9-12, 15, 16, and 21 are cancelled.

Status of Amendments

The Amendment After Final Rejection filed herewith has not been entered. Therefore, the claims which are the subject of this Appeal Brief do not reflect the amendments set forth in the Amendment After Final Rejection. Applicants arguments below, however, refer to the suggested amendments to the claims as indicated in the Amendment After Final Rejection.

Summary of the Invention

The invention is based, in part, on the discovery that cytokine-coated cells, that is cells which have been modified in such a way as to bear a cell-surface associated cytokine, wherein the cytokine is exogenous to the cell, modulate the immune response in the recipient to an antigen or antigens contained in or attached to the cells. Thus, the present invention provides a method for the modulation of the immune response of, or vaccination of an animal, preferably a mammal, to an antigen by administering to the animal a vaccine composition comprising a cytokine-coated cell which comprises the antigen, and wherein the cytokine of the cytokine-coated cells is exogenous to the cell (page 4, lines 15-20). The method of the invention may be further enhanced by the inclusion of an opsonin-enhanced cell in the vaccine composition to be administered to an animal (page 4, lines 24-29). In one embodiment of the invention, the

cytokine of the cytokine-coated cell is a ligand for the GM-CSF receptor, or is a ligand for one of the receptors selected from the group of the IL-2 receptor, the IL-4 receptor, the IL-6 receptor, the IL-10 receptor, the IL-12 receptor, the TNF-α receptor, the IFN-γ receptor, and a chemokine receptor (page 6, lines 5-6).

Applicant submits that it is highly advantageous to use a cytokine that is attached to the antigen-containing cell because it directly facilitates interactions of the cell with host immune system cells, e.g. uptake of the cell (and its antigens) by host APCs. Moreover, the use of an exogenous cytokine, i.e. one that can attach to the cell from outside, is a critical advance over the endogenous expression of heterologous, transmembrane cytokines by genetic modification (e.g., as taught by Hiserodt et al. described below). The latter is highly technically difficult and time-consuming, and sometimes not possible at all; methods for genetic transduction of cells are often inefficient and labor intensive. The most efficient transduction methods use viral vectors, which present safety problems in preparing vaccines for use in humans or other animals. The use of an exogenous, engineered cytokine instead, without genetic manipulation of the vaccine cell, circumvents and therefore solves all of these problems.

Issues

1. Whether claims 1-8, 13, 14, 17-20, and 22-25 are unpatentable as being based on a non-enabling disclosure.

2. Whether claims 1, 2, 13, 14, 17-19, and 22-25 are unpatentable as being anticipated under 35 U.S.C. §102(e) by Hiserodt et al. (U.S. Pat. No. 6,277,368).

3. Whether claims 3-8 and 20 are unpatentable as being obvious under 35 U.S.C. §103(a) over the combined teachings of Hiserodt et al. and the "Known fact" disclosed in the specification on pages 52-54 and 66-68.

Grouping of Claims

The claims do not stand or fall together with regards to the rejection under 35 U.S.C. § 112, first paragraph, 35 U.S.C. § 102(e), or 35 U.S.C. §103(a). The claims under appeal may be

grouped as follows: Group I: Claims 1, 3-8, 17-20, and 22-25; Group II: Claim 2 and 3-8; Group III: Claim 13 and 14; Group IV: Claim 15 and 16; Group V: Claim 21. Applicant submits that the claims of each group are separately patentable over the claims of the other groups as the independent claim of each group contains elements which render the claims of each group novel and patentably distinct over the other groups. Moreover, the claims of each group do not stand or fall together as each claim contains elements not present in the other members of the group.

Argument

Rejection of Claims 1-8, 13, 14, 17-20, and 22-25 Under 35 U.S.C. §112, First Paragraph

The Examiner has rejected the claims as not being enabled for "*vaccinating* a mammal to *any* antigen, comprising administering to a mammal *any* vaccine comprising *any* cytokine coated cell comprising said antigen". Applicants respectfully disagree.

The claims are enabled for vaccination

The Examiners rejection is based, in part, on the Examiner's definition of the term "vaccinate". The Examiner has defined a "vaccine" as "a composition to induce a specific immunity that **prevent** or **protect** against a specific disease caused by a specific agent". The Examiner asserts that the specification is thus not enabling because the specification does not provide information on the immunogenicity of any vaccine comprising any cytokine-coated cell comprising antigen or the ability of such to "protect or prevent from antigen-specific disease". In other words, the Examiner is reading a *100% protective immunity* limitation into the claims based on selective extrinsic evidence, which limitation is inconsistent with the definition provided by the specification.

Applicant submits that the Examiner is erroneously confusing the enablement requirement with the requirement for claim definiteness. The term "vaccinate" is defined in the specification. Applicant has defined the term "vaccinate" as the modulation of an immune response to an antigen (page 9, lines 21-22). More specifically, the specification defines "vaccinating" as the modulation of an immune response to an antigen such that "the response is between about 5 and 100%...more or less efficient, more or less rapid, greater or lesser in

magnitude, and/or more or less easily induced" (page 9, line 26 – page 10, line 1). Moreover, as described above, Applicant has provided extensive teachings as to how one of skill in the art would determine the modulation of an immune response, including assaying for tumor rejection. The specification teaches on page 89, lines 12-19 that if survival or tumor onset in an animal to which has been administered a cytokine-coated cell of the invention differs from a control animal, then immunomodulation has occurred. More specifically, the specification teaches that if at least 10% of the animals in the test group survive 100% longer than the mean survival in the control group, the test is positive, or alternatively, if onset of tumors in 20% of the test animals is 50% later than mean onset in the control animals, the test is positive (i.e., animals are vaccinated). Thus, the meaning of "vaccinate" is clear from the specification and the claims thus clearly set forth the area over which Applicant seeks exclusive rights. The enablement requirement means that the specification must describe the manner of making and using the invention in such clear terms as to enable any person skilled in the art to make and use it. The specification clearly teaches how to perform the vaccination method in a mammal as recited in the claims (this is discussed further below).

Because the term "vaccinate" is clear and unambiguous (i.e., definite), the Examiner has improperly relied on extrinsic evidence to support a different interpretation, and to thus improperly read a limitation (i.e., "protective immunity") into the claims. The Examiner asserts that the meaning of "vaccinate" requires prevention of disease. The Examiner's definition is inconsistent with Applicant's specification-defined definition. Applicant submits that the Examiner, in using his own definition of vaccinate, is improperly importing extrinsic evidence into the prosecution record. The law is clear that the specification may use words in a manner which is inconsistent with the meaning reflected, for example, in a dictionary definition. In such a case, the inconsistent dictionary definition must be rejected [See, e.g., *Reinshaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243 (Fed. Cir. 1998)] ("[A] common meaning, such as one expressed in a relevant dictionary, that flies in the face of the patent disclosure is undeserving of fealty"). Thus, the law supports the conclusion that the presumption in favor of a dictionary definition will be overcome where the patentee, acting as his or her own lexicographer, has clearly set forth an explicit definition of the term. *See In re Paulsen*, 30 F.3d

1475, 1480 (Fed. Cir. 1994); *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1387-88 (Fed. Cir. 1992). This is the case in the instant specification and claims.

Applicant submits that the law expressly gives Applicant the ability to define terms in the claims according to Applicant's wishes, provided that such definition is not "repugnant" to the meaning normally accorded such a term in the art. *In re Hill*, 161 F.2d 367, 73 USPQ 482 (CCPA 1947); *Multiform Desiccants Inc. v. Medzam Ltd.*, 133 F.3d 1473, 1477, 45 USPQ2d 1429, 1432 (Fed. Cir. 1998). Applicant submits that defining "vaccinate" according to the invention to mean a range of immune responses to a vaccine composition (from 5% to full prevention) is not repugnant to the meaning of "vaccinate". The Examiner has asserted in the Final Rejection that "by definition, a vaccine is a composition to induce a specific immunity that prevent or protect against a specific disease caused by a specific agent", although the Examiner provides no citation or basis for this definition. Applicant submits that the meaning of the term "vaccinate" as defined in the specification is not repugnant to the usual meaning of the term. Applicant submits that Dorland's Illustrated Medical Dictionary (1985, 26th Ed., W.B. Saunders Co., Philadelphia) defines "vaccinate" as "to inoculate with a vaccine for the purpose of producing immunity", and further defines "immunity" as "**heightened** responsiveness to antigenic challenge that leads to **more rapid** binding or elimination of antigen than in the nonimmune state". Thus, Applicant submits that the definition of "vaccinate" in the specification as being at least a 5% increase in an immune response up to full prevention of disease is consistent with the understood meaning in the art of the term "vaccinate".

As submitted by Applicant in the telephone interview of November 5, 2003, however, whether the Examiner, as required, accords the term vaccinate with Applicant's definition, or gives the term his own meaning, Applicant has enabled the claims of the invention. The working example provided in the specification demonstrates a reduction in tumor formation which falls under Applicant's definition of "vaccinate". For example, Example 7 teaches that after vaccination with cytokine-coated (GM-CSF-GPI-coated) B16 cells, mice (n=5) had a maximum survival period of 32 days. In contrast, control mice (n=4; administered the B16 cells in the absence of GM-CSF-GPI) had a mean survival time of 16 days. As described above, the specification teaches that vaccination is achieved where the response is between about 5 and

100%...more or less efficient, more or less rapid, greater or lesser in magnitude, and/or more or less easily induced, and further teaches that animals are vaccinated if at least 10% of the animals in the test group survive 100% longer than the mean survival in the control group. As shown in Example 7, 20% of the test group had a survival time which was 100% greater than the mean survival of the control group (1 animal in 5 (i.e., 20%) had a 32 day survival time relative to the mean 16 day survival time in controls). In addition, Example 8 in the specification, although prophetic, teaches vaccination of mice with cytokine coated cells wherein at day 60 after the challenge step, "at least 20% or more of the mice that received GPI-GMCSF coated cells will be alive as compared to control mice". The Rule 132 Declaration filed by Dr. Andrew Segal on February 28, 2003 ("the first Segal declaration") gives a working example of the method described in Example 8. The first Segal declaration teaches that of mice vaccinated with GM-CSF-GPI cytokine coated cells (fibrosarcoma cells), 60-80% of the vaccinated mice did not show development of tumors for 70 days. That is, the vaccine composition of the invention *prevented* tumor formation in 60-80% of treated animals, and moreover, these results fall within the description of "vaccination" provided in Example 8. Further, the Rule 132 Declaration by Dr. Andrew Segal filed with the Amendment After Final Rejection submitted herewith ("the second Segal declaration") demonstrates that 100% of mice which received vaccination with a cytokine-coated vaccine (GM-CSF-HA-coated CMS-5 fibrosarcoma cells) were tumor-free after 40 days, compared to control animals who developed tumors by day 18. That is, the vaccine composition *prevented* tumor growth in all animals to which it was administered. The second Segal declaration also shows that of mice vaccinated with K1735 melanoma cells coated with GM-CSF-HA, 70% were tumor free after more than two months, whereas all control animals had developed tumors in the same time period. That is, the vaccine composition *prevented* tumor growth in 70% of animals to which it was administered. The second Segal declaration also shows that in mice vaccinated with B16F10 murine melanoma cells coated with GM-CSF, an average of 97.5% of metastases to the lungs of the test animals were *prevented.* Similarly, the second Segal declaration shows that lung metastases in a CT26 murine colon carcinoma model were reduced by approximately 45% following vaccination with GM-CSF coated CT26 cells. That is, the method of the invention *prevented* 45% of lung carcinoma metastases compared to control. The Examiner appears to have cited Applicant's statement that the vaccine

compositions of the invention are able to prevent tumor formation as support of his contention that "vaccinate" necessitates prevention, but yet still maintains that the claims are not enabled for prevention of disease. This is somewhat confusing. Applicant has taken the position that the specification has provided a definition of vaccinate which includes both total and partial prevention (i.e., modulation of an immune response), but also provides data showing that, even if the term vaccinate is taken to require prevention, then the claims are nonetheless enabled.

In summary, between the specification and Declarations by Dr. Andrew Segal, Applicant has provided six specific working examples of vaccine compositions which fall under the claims of the invention both in the reduction or prevention of primary tumor formation, and/or the reduction or prevention of metasteses. Thus, regardless of whether "vaccinate" is defined according to the specification or according to the Examiner, the specification is enabling for a method of vaccinating an animal, as claimed. Applicant submits that the data taught in both the Segal declarations is provided in additional support of the vaccination methods already described and supported in the specification, and does not constitute new matter.

(Nevertheless, in order to inspire more economical prosecution of this case, Applicant proposes an alternative to this appeal, i.e., to amend the claims to recite "A method of modulating an immune response in a mammal to a selected antigen..." The Examiner has implied in the Final Rejection that such claim language may overcome the outstanding rejection. Accordingly, as an alternative to this appeal, the Amendment After Final Rejection, submitted herewith, includes an amendment to the claims to replace the term "vaccinate" with the phrase "modulating an immune response in a mammal". Applicant understands that the arguments made herein must be directed to the claims as they stand prior to the entry of the proposed After Final amendment, but where appropriate, have indicated the relevance of Applicant's asserted position with respect to the proposed amended claims should the amendment be entered by the Examiner.)

The claims are enabled for the full scope of vaccination with cytokine

With respect to the Examiner's assertion that the claims are not enabled for vaccinating a mammal to *any* antigen, comprising administering to a mammal *any* vaccine comprising *any*

cytokine coated cell comprising said antigen, the Examiner has previously acknowledged that the specification provided a list of cytokines which would function to bring the cytokine coated cell into contact with a leukocyte. Consistent with the teachings in the specification, the state of the art supports Applicant's assertion that a wide range of cytokines can modulate an immune response to an antigen. For example, Pardoll (1995, *Ann. Rev. Immunol.,* 13:399-415) teaches that cytokines such as TNF, IL-6, IL-7, GM-CSF, IL-3, MCP-1 and G-CSF are effective in modulating immune responses to cells which endogenously express these cytokines. The present invention provides a novel and superior mechanism for the efficient, effective delivery of cytokines to modulate an immune response to an antigen, via the use of exogenous cytokines that can attach to cells. The specification provides extensive teachings on the types of cytokines which are useful in the present invention to stimulate the vaccination and modulation of the immune response of an animal to an antigen (discussion of cytokines useful in the invention is provided below). Therefore applicant submits that the specification is enabling for the claimed method, and provides sufficient teachings to permit one of skill in the art to practice the invention using the full scope of cytokines as recited in the claims.

The specification is enabled for vaccination against antigen

The Examiner has maintained that the specification was not enabled for *any* antigen, particularly in view of the teachings of several publications which reflected the state of the art which existed years prior to Applicant's invention, and which suggested that vaccination of the type claimed was unpredictable (The Examiner cites Ellis (Chapter 29 of Vaccines), Chandrasheker et al. (U.S. Pat. No. 6,248,329), Spitler (Cancer Biotherapy), and Ezzell (NIH Research), all of which were discussed in Applicant's response of October 22, 2003). The Examiner asserts that the specification is not enabled for vaccination against *any* antigen using the cytokine-coated cells of the invention. Applicants respectfully disagree with the Examiner.

As Applicant described in the November 5, 2003 telephone interview, one advantage of the present invention is that upon administration of the vaccine composition of the invention to a mammal, the mammal's immune system is presented with **all** of the antigens which are present in or on the cytokine coated cell. It is thus, not necessary that one of skill in the art know the

specific antigens present in the cell (i.e., which epitope of the vaccine the mammal is reacting to) in order to successfully practice the invention. It therefore also provides an opportunity to elicit an immune response against multiple antigens in a cell, regardless of whether the identity of any of those antigens is known. Furthermore, whole cells may be used as a substrate in assays to determine whether an immune response to an antigen contained in the cells has been modulated, so that the identity of a specific antigen need not be known in order to demonstrate the successful practice of the invention.

Applicant submits that an antigen, by definition, is capable, at least when delivered by the methods of the invention, of eliciting an immune response. Applicant also submits that the immune response to an antigen generally arises from the same set of mechanisms, regardless of the origin of the antigen. Thus, for example, immune responses to the MAGE-1 melanoma tumor antigen, the herpes simplex glycoprotein D viral antigen, and the diptheria toxoid bacterial antigen all result from uptake of the respective antigen by antigen presenting cells, intracellular processing of the respective antigens into short peptides, and presentation of these peptides by APCs to T cells, with activation and expansion of these T cells. Applicant therefore submits that the state of the art supports the expectation that if one or several antigens are operative according to the invention, that many will be, thereby providing enablement for the full scope of the claims. Applicant submits that they have provided evidence that the invention is operative for at least three different types of antigens, and thus provides enablement sufficient to support the full scope of the claimed invention.

The specification provides sufficient enabling disclosure

Applicant submits that to satisfy the enablement requirement, the specification must provide sufficient teaching to permit one of skill in the art to practice the invention, including making a determination of whether a specific species of the invention is operable, without undue experimentation. While the Examiner asserts that the specification is not enabling for each and every possible embodiment of the invention (e.g., the Examiner asserts that all antigens derived from pathogens may not be successful in vaccinating a mammal), Applicant submits that this is irrelevant. The courts have long held that non-operative embodiments are permissible, and are

not fatal to a finding of enablement. Applicants respectfully refer the Examiner to *Ex parte Mark* (12 U.S.P.Q.2d 1904 (Bd. Pat. App. & Int. 1989). In this case, the broadest appealed claim was as follows:

> 1. A synthetic mutein of a biologically active native protein in which the native protein has at least one cysteine residue that is free to form a disulfide link and is nonessential to said biological activity, said mutein having at least one of said cysteine residues substituted by another amino acid and said mutein exhibiting the biological activity of said native protein.

Id., at 1905. The claim in *Mark* thus covers a mutant protein containing an amino acid that has been substituted for a non-essential cysteine residue. The specification at issue in that case set forth three working examples in which it was shown that each of three proteins had a non-essential cysteine residue which could be deleted or replaced, with retention of biological activity in the resulting mutein.

The Examiner in *Mark* raised two overbreadth issues with respect to this claim: (1) whether the specification supported a claim broad enough to encompass any mutant protein and (2) whether the specification supported a claim broad enough to encompass substitution of any cysteine residue within the protein. The Examiner's reasons for rejecting the broad claim in *Mark* were as follows:

> Essentially, the position taken in the rejection is that it would require undue further experimentation to construct by recombinant methods (site specific mutagenesis) the innumerable muteins encompassed by the instant claims (claims encompass modification of any protein which comprises a "non-essential" cysteine residue) and to screen the muteins produced for any of those which exhibit biological activity after modification.

Id., at 1906. The Examiner also stated that the claims were broad enough to "encompass any protein, even those which have not been characterized or cloned." *Id.*, at 1906.

The Board of Appeals disagreed with the Examiner's analysis and concluded that the claim was enabled for <u>all</u> cysteine-depleted muteins of biologically active proteins in which the

mutein retains the biological activity of the native protein. The Board reframed the enablement issue and reasoned that the record established that, for a given protein having cysteine residues, one skilled in the art 1) would be able to substitute for or delete the cysteine residues as desired, and 2) could routinely determine whether deletion or replacement of cysteine residues in a given instance in fact resulted in an operative mutein falling within the claims. Upon applying this framework to the specification and claims before them, the Board concluded that, although some cysteine-depleted muteins may not be operable, the disclosure was enabling for the claims, since one skilled in the art was (1) clearly enabled to perform the work that was needed to produce any given mutein falling within the description in the claims and (2) to determine whether the cysteine depleted construct retained the biological activity of the native protein.

Applying the rational of the Board in *Mark*, Applicant submits that the specification has provided sufficient teachings to enable one of skill in the art to make and use the claimed invention without undue experimentation. Given the claims of the present invention, the specification must teach one of skill in the art how to make a vaccine according to the invention, including a description of the cytokines and antigens to be included in the vaccine. The specification must also teach what types of cells may be used to produce the vaccine composition, and how to administer the vaccine to a mammal. Lastly, the specification must teach how one of skill in the art would determine whether a mammal to which the vaccine is administered, is vaccinated according to the invention. The specification teaches the following.

1. The specification teaches on pages 16-47, more than six different families of cytokines useful in the invention, including over 80 specifically referenced cytokine molecules which may be used in vaccine compositions of the invention. These teachings include discussions of the roles of these cytokines in the immune response.

2. The specification teaches at pages 68-71, that antigens useful in the methods of the invention include **viral antigens** including hepatitis viral antigens e.g., hepatitis A, B. and C, viral components such as hepatitis C viral RNA; influenza viral antigens such as hemagglutinin and neuraminidase and other influenza viral components; measles viral antigens such as the measles virus fusion protein and other measles virus components; rubella viral antigens such as

proteins E1 and E2 and other rubella virus components; rotaviral antigens such as VP7sc and other rotaviral components; cytomegaloviral antigens such as envelope glycoprotein B and other cytomegaloviral antigen components; respiratory syncytial viral antigens such as the RSV fusion protein, the M2 protein and other respiratory syncytial viral antigen components; herpes simplex viral antigens such as immediate early proteins, glycoprotein D, and other herpes simplex viral antigen components; varicella zoster viral antigens such as gpI, gpII, and other varicella zoster viral antigen components; Japanese encephalitis viral antigens such as proteins E, M-E, M-E-NS 1, NS 1, NS 1 -NS2A, 80%E, and other Japanese encephalitis viral antigen components; rabies viral antigens such as rabies glycoprotein, rabies nucleoprotein and other rabies viral antigen components; **bacterial antigens**, including pertussis bacterial antigens such as pertussis toxin, filamentous hemagglutinin, pertactin, FIM2, FIM3, adenylate cyclase and other pertussis bacterial antigen components; diptheria bacterial antigens such as diptheria toxin or toxoid and other diphtheria bacterial antigen components; tetanus bacterial antigens such as tetanus toxin or toxoid and other tetanus bacterial antigen components; streptococcal bacterial antigens such as M proteins and other streptococcal bacterial antigen components; gram- negative bacilli bacterial antigens such as lipopolysaccharides and other gram-negative bacterial antigen components; Mycobacterium tuberculosis bacterial antigens such as mycolic acid, heat shock protein 65 (HSP65), the 30kDa major secreted protein, antigen 85A and other mycobacterial antigen components; Helicobacter pylori bacterial antigen components; pneumococcal bacterial antigens such as pneumolysin, pneumococcal capsular polysaccharides and other pneumococcal bacterial antigen components; hemophilus influenza bacterial antigens such as capsular polysaccharides and other hemophilus influenza bacterial antigen components; anthrax bacterial antigens such as anthrax protective antigen and other anthrax bacterial antigen components; rickettsiae bacterial antigens such as romps and other rickettsiae bacterial antigen component; **fungal antigens** such as candida fungal antigen components; histoplasma fungal antigens such as heat shock protein 60 (HSP60) and other histoplasma fungal antigen components; cryptococcal fungal antigens such as capsular polysaccharides and other cryptococcal fungal antigen components; coccidiodes fungal antigens such as spherule antigens and other coccidiodes fungal antigen components; and tinea fungal antigens such as trichophytin and other coccidiodes fungal antigen components; **parasite antigens** such as plasmodium falciparum antigens such as merozoite surface antigens, sporozoite

surface antigens, circumsporozoite antigens, gametocyte/gamete surface antigens, blood-stage antigen pf 1 55/RESA and other plasmodial antigen components; toxoplasma antigens such as SAG-1, p30 and other toxoplasma antigen components; schistosomae antigens such as glutathione-S-transferase, paramyosin, and other schistosomal antigen components; leishmania major and other leishmaniae antigens such as gp63, lipophosphoglycan and its associated protein and other leishmanial antigen components; and trypanosoma cruzi antigens such as the 75-77kDa antigen, the 56kDa antigen and other trypanosomal antigen components; and **tumor antigens** such as telomerase components; multidrug resistance proteins such as P-glycoprotein; MAGE-1, alpha fetoprotein, carcinoembryonic antigen, mutant p53, papillomavirus antigens, gangliosides or other carbohydrate-containing components of melanoma or other tumor cells.

3. The specification teaches at page 71 to 76, methods for expressing nucleic acid molecules encoding antigens of the invention in a host cell. The specification also teaches at page 78, lines 3-6 that a cell of the invention may already express a target antigen, and therefore need not be made to express the antigen.

4. The specification teaches at page 76-77, multiple cell types which may be used according to the invention to generate cytokine-coated cells.

5. The specification teaches at page 104-107, methods for administering the vaccine of the invention to a mammal, including methods for preparing pharmaceutical formulations, dosages, and routes of administration.

6. The specification teaches at page 82-89, **methods for determining whether an animal has been vaccinated by a vaccine composition according to the invention.** Specifically, the specification teaches that vaccination of a mammal may be determined by assays for antigen-induced T cell proliferation, assays for lymphokine-dependent cell proliferation, [^{3}H]thymidine pulse and harvest of cell cultures, immuno-enzymatic assays for cytokines using NIP- and HRPO-labeled antibodies, measuring induction of *in vivo* antibody responses to protein/polysaccharide antigens, and assays using tumor rejection. With respect to determining vaccination based on tumor rejection, the specification teaches that if survival or

tumor onset in animals to which have been administered a vaccine of the invention differs from that of a control animal, then immunomodulation has been achieved.

Thus, under established law, the specification provides more than ample guidance to one of skill in the art to practice the invention according to the full scope of the claims. The specification teaches how to utilize a cytokine according to the methods of the invention and methods for determining the effectiveness of the vaccine compositions of the invention. The individual methodologies, cytokines, and molecular biological techniques described in the application for use in practicing the invention are routine in the art. Accordingly, given Applicant's teachings of the specific types of molecules to be used according to the invention, and the teachings of specific routine assays to determine whether a mammal is vaccinated by the method of the invention, provide sufficient disclosure to permit one of skill in the art to practice the invention without undue experimentation.

Testing is not undue experimentation

The Examiner has asserted that it would be undue experimentation for one of skill in the art to have to test different cytokines and cell types to determine which combination would make an effective vaccine for a particular application. Applicants submit that the legal standard on which the enablement requirement is based hinges on a determination of whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation. As stated in *United States v. Telectronics, Inc.*, 857 F.2d 778, 8 USPQ 2d 1217 (Fed. Cir. 1988), *cert denied*, 490 U.S. 1046 (1989), the court reversed the findings of the district court of undue experimentation where the specification provided only one working example. "The court ruled that since one embodiment (stainless steel electrodes) and the method to determine dose/response was set forth in the specification, the specification was enabling. The question of time and cost of such studies...failed to show undue experimentation." MPEP 2164.06 further points to *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed Cir. 1988) (citing *In re Angstadt*, 537 F.2d 489, 502-504, 190 USPQ 214, 217-19 (CCPA 1976)), which states:

> The test is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed.

Applicants submit that, like the patent at issue in *United States v. Telectronics, Inc., supra*, the present specification teaches not only one, but many embodiments of the invention which would fall under the claims, and methods for determining whether a specific embodiment would function to vaccinate a mammal according to the claimed invention. Thus, that one of skill in the art may have to test a specific vaccine composition to determine whether it provides the particular vaccination desired does not amount to undue experimentation because the specification provides guidance in selecting the vaccine components and the tools needed to determine the effectiveness of the vaccine.

Applicant also submits that in general, with respect to the amended claims drawn to "modulating an immune response", the practitioner of the invention will already be in possession of the antigen(s) to which he or she desires to modulate an immune response., e.g. in the form of cells containing the antigen(s). That is, the present invention (as claimed in the proposed amendments filed herewith) provides a method for modulating an immune response once cells comprising an antigen have been selected. The antigen, in the form of a cell bearing the antigen will be selected by one of skill in the art, based on their reasons for desiring to modulate the immune response. Thus, the selection of the antigen or cell to use with the method of the invention is left to the discretion of the practitioner, and for purposes of practicing the invention, the practitioner's motivation in selecting a particular antigen in the form of an antigen bearing cell is irrelevant. The present invention provides the method by which the skilled practitioner can then utilize their selected antigen-bearing cell to modulate an immune response. Applicant also reiterates, as discussed above, that operativity with respect to one (or in this case actually several) antigen in combination with a given cytokine indicates operativity for a wide range of antigens in combination with the same cytokine, since the immune system uses the same mechanisms to process antigens from disparate sources. Thus, one of skill in the art, guided by the specification, can make a determination of the particular cytokine, antigen, and cell to be used based on their own knowledge of and predictions for success for the particular type of

vaccination they which to achieve, and then follow the teachings of the specification to test whether vaccination has been attained. This can be performed to the full scope of the claimed invention without undue experimentation.

Rejection of Claims 1, 2, 13, 14, 17-19, and 22-25 Under 35 U.S.C. §102(e)

Claims 1, 2, 13, 14, 17-19, and 22-25 stand rejected under 35 U.S.C. §102(e) as being anticipated by Hiserodt et al., U.S. Pat. No. 6,277,368 ("the `368 patent"). It is the Examiner's position that the `368 patent teaches a method for vaccinating a mammal using a "vaccine composition comprising a cytokine coated cell comprising an exogenous cytokine," as claimed by the Applicant. Specifically, the Examiner states in the Final Office Action mailed January 8, 2004 as follows:

> [I]t is the examiner position, that US Patent `368 teaches a method of vaccinating a mammal, including mouse, to selected antigen, comprising administering a **vaccine comprising a primary tumor cells and cytokine-secreting cells** (see entire document, Abstract in particular). It is noted that **"cytokine-coated cells" of the present invention are obtained by mixing cell[s] that already express an antigen, a tumor antigen for example, with engineered cytokines that can become membrane-bound** (see page 79 lines 9-25 in particular). US Patent `368 teaches that cytokines secreted by said cytokine-secreting cells are exogenous to primary tumor cells (see column 7, lines 25-40 in particular). . . . (Final Office Action , page 5, lines 22-29; bold and underlined emphasis added)

Applicant respectfully refers the Board to page 4, lines 13-16, of the specification which states that "cytokine-coated cells" are "cells which have been modified in such a manner as to bear a cell-surface associated cytokine" which "modulates the immune response in the recipient to a selected antigen or antigens contained in or attached to the [cytokine-coated] cells." Thus, the "cytokine-coated cells" of the claimed invention are modified to comprise a cell-surface associated cytokine which modulates an immune response to an antigen(s) present within or attached to the cytokine-coated cell. In other words, by the definition of cytokine-coated cell provided in the specification, **the claimed invention requires the administration of a cytokine-coated cell which (1) has been modified to contain a cytokine attached to the outer surface of the cell membrane, and (2) contains an antigen or antigens, either within or**

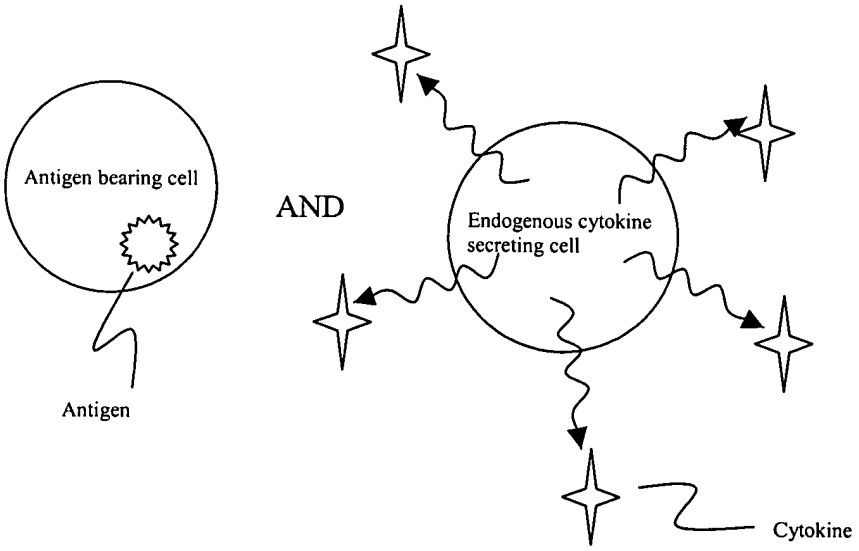
attached to its outer surface. Thus, the cytokine-coated cell comprises the antigen and a cytokine attached to the outer surface.

Equally importantly, **the claims of the present invention further require that the cytokine attached to the cytokine-coated cell be exogenous to that cell**. The specification defines an "exogenous cytokine" as a cytokine which is "introduced from or produced outside the cell" (page 10, lines 28-29).

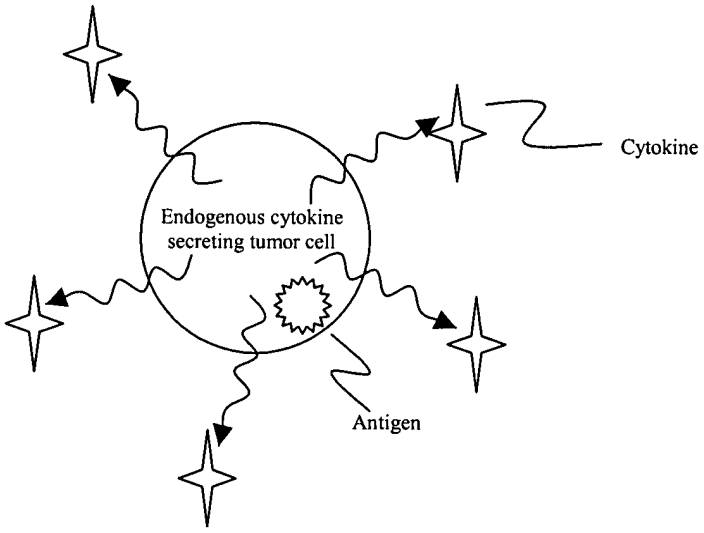
In view of the above definitions in the specification, **the claimed invention requires the use of a cytokine-coated cell which (1) has been modified to contain an cytokine attached to the outer surface of the cell membrane, wherein the cytokine is exogenous to the cell, and (2) contains an antigen or antigens, either within or attached to its outer surface.** The '368 patent cited by the Examiner neither teaches nor suggests such a cell.

More specifically, the '368 patent teaches:

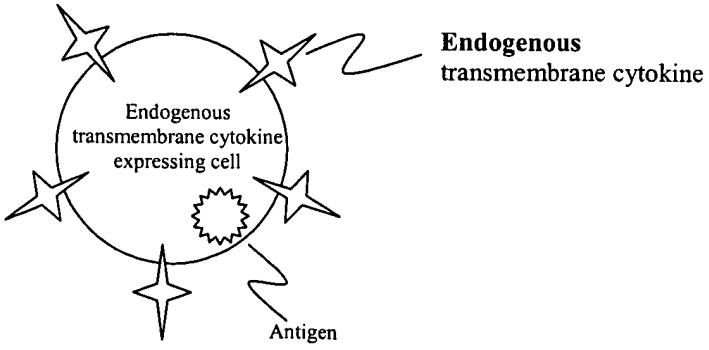
- A first cell which comprises an antigen, and a second cell which secretes an endogenous cytokine (col. 7, lines 13-17; col. 15, lines 37-41); that is the cytokine is expressed from within the cell. No cytokine is attached to the surface of the antigen-containing cell; thus, this embodiment of Hiserodt does not anticipate the instantly claimed invention.



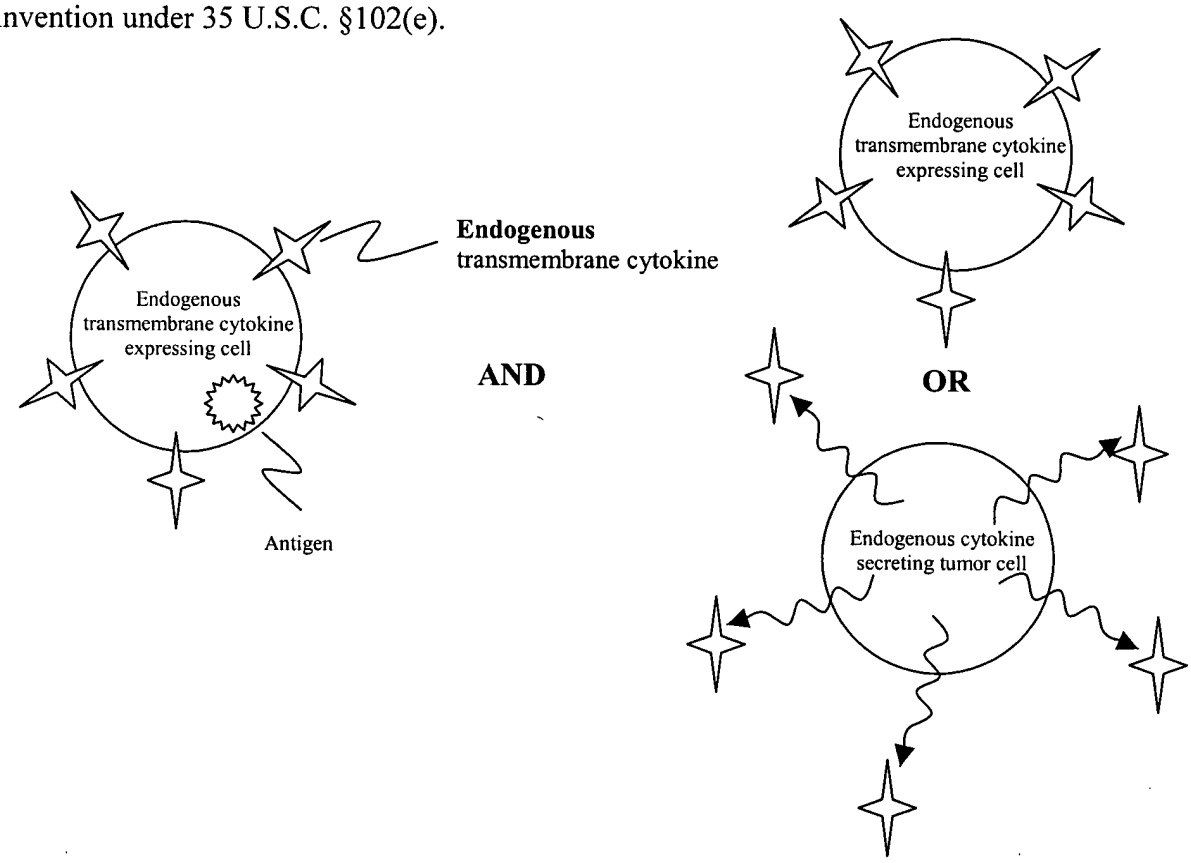
- An antigen-containing cell that is genetically modified to secrete a soluble, endogenous cytokine (col.7, lines 21-26; col. 11, lines 30-34). Again, no cytokine is attached to the surface of the antigen-containing cell; thus, this embodiment of Hiserodt does not anticipate the instantly claimed invention.



- An antigen-containing cell that is genetically modified to express an endogenous, transmembrane cytokine (col. 14, lines 57-65). Here, a cytokine is attached to the surface of the antigen-containing cell, but it is ***endogenous*** to this cell, i.e. expressed from within, rather than ***exogenous*** to it. Thus, this embodiment of Hiserodt does not anticipate the instantly claimed invention under 35 U.S.C. §102(e).



- An antigen-containing cell genetically modified to express one cytokine, admixed with a second cell genetically modified to express another cytokine (col. 11, lines 34-38). Either cytokine may be a cell-surface cytokine, but, again, Hiserodt only teaches endogenous expression by genetic modification; there is no teaching of a cytokine that is attached to the surface of the antigen-containing cell, having been added to it ***exogenously***. Thus, once again, neither this nor any embodiment of Hiserodt anticipates the instantly claimed invention under 35 U.S.C. §102(e).



In each of the embodiments taught by Hiserodt, the antigen bearing cell is administered as a vaccine where either (1) the antigen bearing cell is in combination with soluble (i.e., **NOT** membrane bound) cytokine secreted from a second cell or the antigen bearing cell, or (2) where the antigen bearing cell expresses **endogenous** membrane bound cytokine, or is administered with a second cell that expresses **endogenous** membrane bound cytokine.

Taken in view of the description of the various vaccine compositions of Hiserodt set forth above, it can be seen that none of the Hiserodt vaccine compositions anticipate the claims. It is critical to note that Hiserodt teaches that "a cytokine is referred to as a "transmembrane" protein if it normally remains stably associated in the membrane *of the cell in which it is produced*" (emphasis added; col. 13, lines 19-21). Thus, to the extent that Hiserodt teaches expression in an allogenic tumor cell of a transmembrane cytokine, this teaching is restricted to a situation in which the transmembrane cytokine is *endogenous* to the cell to which it is attached. While Applicant agrees that, in one embodiment, Hiserodt teaches an antigen bearing cell in combination with exogenous cytokine, the exogenous cytokine is secreted by another cell in the vaccine and is thus not associated with the cell surface of the antigen bearing cell to yield a cytokine coated cell as claimed in the present invention. Hiserodt does **not** teach a cell bearing an exogenous membrane bound cytokine, but teaches only an *endogenous* membrane bound cytokine. Hiserodt does teach a composition in which the antigen bearing cell is administered along with a cell producing cytokine which is exogenous to the antigen bearing cell, but this teaching is restricted to *soluble* cytokine molecules, and **not** those which would be cell-surface associated with the antigen bearing cell. Accordingly, Applicants submit that despite the various vaccine compositions taught by Hiserodt, there is no teaching of a vaccine composition in which a cytokine coated cell wherein the cytokine is exogenous to the cell is administered to a mammal to vaccinate the mammal. Applicants therefore submit that the claims are not anticipated by Hiserodt, and request that the rejection be reconsidered and withdrawn.

Rejection of Claims 3-8 and 20 Under 35 U.S.C. §103(a)

The Examiner has rejected claims 3-8 and 20 under 35 U.S.C. §103 as being obvious over Hiserodt in view of a "Known fact" disclosed in Applicant's specification on pages 52-54 and 66-68. The Examiner asserts that Hiserodt's teachings are deficient with respect to claims 3-8 and 20 in that Hiserodt does not teach the specific types of engineered cytokine or specific opsonin-enhanced cells as recited in these claims. The Examiner asserts, however, that the "Known fact" disclosed in the specification teaches that it is conventional and within the skill of the art to produce (i) an opsonin-enhanced cell, wherein the opsonin of the cell is mannose binding protein or alpha' chain of C3b to allow more efficient binding, engulfment and

internalization of the antigen; (ii) an engineered cytokine by attaching a lipid to the cytokine to permit a complex to become stably associated with the cell membrane. Applicant respectfully disagrees with the Examiner.

Applicant submits that there is no motivation to combine the teachings suggested by the Examiner. Applicant submits that the disclosure in the specification (the "known fact" asserted by the Examiner) that the technology existed to link a lipid moiety to a cytokine molecule, or to employ an opsonin to enhance binding and engulfment does not equate to a teaching that such a modification is obvious for purposes of immunizing an animal. Where in Hiserodt and/or the known fact does one find the suggestion to combine a cytokine-coated cell with an opsonin or lipid moiety as claimed in claims 3-8? The level of skill in the art (e.g., the technique for modifying a cytokine to include a lipid) cannot be relied upon to provide the suggestion to combine references (*Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308 (Fed. Cir. 1999), particularly when the instant invention claims elements that are novel over the prior art. The Examiner asserts that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. Provided that it takes in to account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper (citing *In re McLaughlin*, 170 USPQ 209 (CCPA1971)). This is exactly the basis on which the Examiner's obviousness rejection is flawed. The rejection is based on knowledge gleaned only from the Applicant's disclosure; that is, the novel disclosure of methods for vaccinating or modulating an immune response to an antigen using cytokine coated cells comprising exogenous cytokine.

The "Known fact" referred to by the Examiner, that such an engineered cytokine could be used according to the methods of the invention to vaccinate a mammal against an antigen, and that the vaccine composition may be combined with an opsonin is a teaching which is unique to the present specification. The combination of a cytokine coated cell and an opsonin, as claimed in the invention, is not a "known fact". It is the combination on which the invention is based; immunization with cytokine-coated cells bearing an exogenous cytokine had never existed prior to the instant invention. The law is clear that taking the teachings of the present invention

relating to the claimed method and attempting to fill in the gaps in the prior art with such teachings amounts to hindsight reconstruction of the invention, and is not permitted. Applicant submits that to establish the motivation to combine the "Known fact" with Applicant's novel teachings of a cytokine coated cell, "particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed" (emphasis added) *In re Kotzab,* 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). Applicant submits that since, as described above with respect to the Examiner's mistaken rejection under 35 U.S.C. §102(e), Hiserodt et al. does not teach the claimed invention, the Examiner has not met this burden of demonstrating why one of skill in the art, with no knowledge of Applicant's invention, would have been motivated to make the suggested combination. Without the requisite motivation, there can be no finding of obviousness.

The law is clear that "[i]t is impermissible . . . simply to engage in a hindsight reconstruction of the claimed invention...The references themselves must provide some teaching whereby the Applicant's combination would have been obvious." (*In re Gorman*, 18 U.S.P.Q.2d 1885, 1888 (Fed. Cir. 1991)). In addition, it has long been recognized that a novel combination of elements, not previously combined in the same way by the prior art can be patentable regardless of whether a specific element is disclosed in the art. *Kesling v. General Motors Corporation.* 66 F.Supp.1 (1946). The methods of vaccinating an animal against an antigen using a vaccine composition comprising a cytokine-coated cell as claimed is novel and non-obvious over the prior art.

The Examiner has argued that it was well known in the art that an immune response to an antigen could be enhanced by coupling the antigen to an opsonin. Relying on this, the Examiner has argued that one of skill in the art would have been motivated to combine the cytokine-coated cell vaccine composition of the invention with an opsonin to enhance binding and engulfment. The flaw in this argument is that the Examiner is trying to combine a known element with a novel invention to render the invention obvious. Applicants submit that the combination of an alleged obvious variant of a novel invention cannot render the invention as a whole obvious, because the combination of a novel invention and an alleged obvious variation is necessarily

non-obvious. In other words, the combination of Hiserodt and the "Known fact" does not teach each element of the claimed invention as required for a finding of obviousness. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). How could it be obvious to one of skill in the art to combine, for purposes of immunization, an opsonin with the exogenous cytokine coated cells of the invention, when immunization with the cytokine coated cells of the invention had never been described outside of the present application? The motivation to combine the references cited by the Examiner is gleaned only from Applicant's own disclosure of the invention, and is thus an impermissible hindsight reconstruction of the claimed invention (*In re McLaughlin*, 443 F.2d 1392 (CCPA 1971)).

Applicant therefore submits that the present invention is not obvious over Hiserodt in view of Applicant's own disclosure, and request that the rejection be reconsidered and withdrawn.

Conclusion

It is respectfully requested that the rejections be reversed and that the claims be allowed. This Brief is being filed in triplicate.

Respectfully submitted,

Date: March 25, 2004

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Appendix I

1. A method of vaccinating a mammal to a selected antigen, the method comprising

administering to a mammal a vaccine composition comprising a cytokine-coated cell comprising said selected antigen, wherein said cytokine of said cytokine-coated cell is exogenous to said cell, and wherein said mammal is vaccinated to said selected antigen.

2. A method of vaccinating a mammal to a selected antigen, the method comprising

administering to a mammal a vaccine composition comprising a cytokine-coated cell, wherein said cytokine of said cytokine-coated cell is exogenous to said cell, wherein said cytokine-coated cell comprises said selected antigen and is admixed with an engineered cytokine, and wherein said mammal is vaccinated to said selected antigen.

3. The method of claim 1 or claim 2 wherein said vaccine composition further comprises an opsonin-enhanced cell.

4. The method of claim 3 wherein said opsonin of said opsonin-enhanced cell is selected from the group consisting of mannose binding protein or the alpha' chain of C3b.

5. The method of any one of claims 1 or 2 wherein said cytokine of said cytokine-coated cell comprises a lipid.

6. The method of claim 5 wherein said cytokine comprises a GPI moiety.

7. The method of claim 5 wherein said cytokine comprises a fatty acid.

8. The method of claim 7 wherein said fatty acid is palmitate.

13. A method of vaccinating a mammal to a selected antigen, the method comprising administering to the mammal a vaccine composition comprising a cytokine-coated cell, , wherein said cytokine of said cytokine-coated cell is exogenous to said cell, wherein said cytokine is a ligand for the GM-CSF receptor, and wherein said mammal is vaccinated to said selected antigen.

14. The method of claim 13, wherein said ligand for the GM-CSF receptor is GM-CSF.

15. A method of vaccinating a mammal to a selected antigen, the method comprising; administering to a mammal a vaccine composition comprising a cytokine-coated cell, , wherein said cytokine of said cytokine-coated cell is exogenous to said cell, wherein said cytokine is a ligand for one of the following receptors: the IL-2 receptor, the IL-4 receptor, the IL-6 receptor, the IL-10 receptor, the IL-12 receptor, the TNF-α receptor, the IFN-γ receptor, a chemokine receptor.

16. The method of claim 15, wherein said ligand is selected from the group consisting of: IL-2, IL-4, IL-6, IL-10, IL-12, TNF-α, IFN-γ, or a chemokine.

17. The method of any one of claims 1 or 13, wherein said cell of said cytokine-coated cell is a pathogenic cell.

18. The method of claim 17 wherein said pathogenic cell is a malignant tumor cell.

19. The method of claim 17 wherein said cell of said pathogenic cell is selected from the group consisting of: a bacterium, a virus, a fungus, a cell of a parasite.

20. The method of claim 17, wherein said vaccine composition further comprises an opsonin-enhanced pathogenic cell.

22. The method of any one of claims 1 or 13, wherein said cytokine-coated cell is substantially unable to divide in vitro.

23. The method of any one of claims 1 or 13, wherein said vaccine composition is attenuated.

24. The method of any one of claims 1 or 13, wherein said cytokine is an antitumor cytokine.

25. The method of any one of claims 1 or 13, wherein said cytokine is extremely bioactive, natively bioactive, or suprabioactive.

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PARACRINE CYTOKINE ADJUVANTS IN CANCER IMMUNOTHERAPY

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KEY WORDS: paracrine cytokine adjuvants, immunotherapy

ABSTRACT

Advances in our understanding of the molecular events of antigen recognition by T cells and T cell activation are opening up new approaches to cancer immunotherapy. The identification and cloning of cytokines provide one important set of tools for manipulating immunologic responses. For cancer therapy, cytokines such as interleukin-2 have been administered systemically. However, systemic administration of cytokines ignores the paracrine nature of their action. Recently, an alternative approach has been explored that produces high concentrations of cytokines local to the tumor cells. This is achieved either by transduction of the tumor cells with the cytokine gene or by mixture of the tumor cells with cytokine containing biodegradable polymer microspheres. Under these circumstances, the locally released cytokine produces a strong local inflammatory response specific to the particular cytokine. In some cases, a potent tumor-specific T cell response results, capable of mediating regression of systemic tumor deposits. This paracrine delivery of cytokines can therefore be considered as a new type of adjuvant in the design of vaccines for cancer as well as microbial infections.

INTRODUCTION

Two of the most actively investigated areas in cancer immunotherapy have been vaccines and cytokines. In the past, these two approaches developed rapidly and in parallel, but virtually without intersection. Cancer vaccination—also referred to as active immunotherapy—is based on the concept, originally put forward by William Coley, that tumors possess distinct antigens that should be recognized by the immune system. Most cancer vaccines have consisted

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of killed tumor cells or tumor cell lysates mixed with adjuvants such as *Bacillus Calmette Geurin* and *Corynebacterium parvum,* in an attempt to amplify tumor-specific immune responses enough to produce a therapeutically relevant tumoricidal effect (1–4). Delineation of effector mechanisms induced by cancer vaccines has focused on T cell responses. Because of their ability to recognize peptides derived from either intracellular or cell membrane antigens, T cells have the potential to recognize any genetic alteration characteristic of a tumor. Interestingly, for the one human tumor in which molecular targets of antitumor immune responses have been identified—melanoma—the dominant antigens are not derived from genetically altered gene products, but come rather from lineage-specific differentiation antigens specific to melanocytes (5–11).

The initial development of cytokines for cancer immunotherapy involved systemic administration of pharmacologic doses of recombinant protein. The major cytokine that has been used for systemic administration is the lymphokine interleukin 2 (IL-2) (12). By the early 1980s, IL-2 had been recognized as a major T cell growth factor as well as a T cell activation factor. Furthermore, it appears to be a potent growth and activation factor for natural killer (NK) cells, which were originally envisioned to represent a distinct lymphocyte population specifically endowed with capabilities to recognize and kill tumor cells. Incubation in supraphysiologic quantities of IL-2 induced a hyperactivated cytotoxic state in NK cells (the lymphokine-activated killer phenomenon), enabling them to lyse classically NK-resistant targets (13, 14).

The in vivo administration of IL-2 was only made feasible once the IL-2 gene was cloned, thereby enabling the production of large amounts of recombinant material. A tremendous effort in the evaluation of systemic IL-2 administration for cancer therapy ensued, and this approach continues to be vigorously explored. In general, the clinical results with systemic IL-2 have been modest, and systemic toxicity is often severe, particularly at higher doses. Nonetheless, there is a documented response rate to systemic IL-2 of roughly 20% in patients with metastatic kidney cancer and melanoma (15, 16).

The major conceptual problem in administering systemic cytokines to activate any sort of immunologic response is that the approach fails to account for a major principal in lymphokine physiology, namely, that lymphokines maintain the specificity of immunologic responses partially through their paracrine function. Under physiologic circumstances, appropriate lymphokines are produced in high amounts local to the site of antigen, often acting in concert with antigen-driven signals to generate effector responses. Systemic levels of most lymphokines during an immunologic response are orders of magnitude below the kd for their receptor, and these levels therefore do not prompt systemic effects. Systemic administration of lymphokines at pharmacologic doses produces high concentrations of lymphokines in the vasculature at sites

distant from the antigen and often suboptimal levels in tissues at the site of antigen.

In the past five years, the fields of cancer vaccines and cytokines have come together in new approaches that seek to express specific cytokines local to the site of tumors. This notion was first proposed to exploit the paracrine physiology of cytokine action with the hope of generating more potent and antigen-specific immunologic responses. These studies in cancer have led to the development of the paracrine cytokine adjuvant concept, one that will likely expand far beyond the arena of cancer vaccines and into infectious diseases, transplantation, and possibly autoimmunity.

XENOGENIZATION—THE FORERUNNER TO PARACRINE CYTOKINE ADJUVANTS

As is discussed in detail below, the major approach to generating high local concentrations of specific cytokines at vaccine sites has been to introduce cytokine genes into tumor cells under regulation of a promoter that is active in the tumor cell. Historically, the forerunner to these studies involved the genetic modification of tumor cells by the introduction of "foreign antigens." The first studies demonstrating enhanced immunogenicity of genetically altered tumor cells were performed 25 years ago by Lindenman & Klein (17). They showed that vaccination with influenza virus–infected tumor cell lysates generated enhanced systemic immune responses against a challenge with the original tumor cells. This effect is often referred to as xenogenization. Xenogenization with viral infection is currently being explored in clinical trials with colon cancer, in which vaccines have been made using autologous cells infected with Newcastle disease virus (18).

A more recent version of this approach involved the transduction of tumor cells with specific viral genes such as influenza hemagglutinin (HA). Again, certain HA expressing tumor clones were capable of being rejected by their syngeneic hosts, whereas the nontransduced cells formed tumors without any evident immunologic response. In some cases, animals that had rejected the tumor transfectants were now immune to challenge with nontransfected tumor cells (19). Another variation on this theme involved the introduction of allogeneic MHC genes into tumor cells (20, 21). An analogous observation in these experiments was the enhancement of immunologic responses against the autologous nontransduced tumor cells. Originally, investigators invoked the "associative recognition" theory to explain this effect, proposing that weak antigens derived from the tumor cells might become associated with or somehow linked to the more potent viral antigen and thereby elicit immunologic responses against them. However, the associative recognition theory has not found a molecular basis. Instead, a revised concept has emerged that the xenogenization effect occurs through induction of helper lymphokines in response

to the strong foreign antigens local to the tumor. This burst of lymphokine production can amplify normally weak responses to the poorly immunogenic endogenous tumor antigens. Consistent with this hypothesis, the immunologic response generated by HA transduced tumor cells has been found to be critically CD4 dependent (22). The revised hypothesis to explain the xenogenization effect led to the idea of directly introducing cytokine genes into the tumors themselves.

CYTOKINE GENE–TRANSDUCED TUMOR CELLS

The first cytokine genes to be introduced into tumor cells were IL-2 (22, 23) and IL-4 (24, 26). A number of in vivo studies performed in murine tumor models illustrate some central themes. First, examination of the site of injected transduced tumor reveals a vigorous inflammatory infiltrate. The characteristics of the infiltrate are quite distinct and depend both on the particular lymphokine being expressed and on the amount of lymphokine secreted. For example, IL-2-transduced tumors are characterized by extensive lymphocytic infiltrates consisting of $CD4^+$ and $CD8^+$ cells as well as cells bearing NK markers. In contrast, IL-4-transduced tumors are characterized by infiltrates consisting predominately of macrophages and eosinophils. Small numbers of lymphocytes infiltrate IL-4-transduced tumor sites only a few days after the initial injection. The characteristics of the cellular infiltrates appear to be independent of the particular tumor injected, indicating that they are antigen nonspecific. For IL-4-transduced tumors, the striking eosinophil infiltrate has been attributed to the induction of VCAM expression on local vascular endothelial cells by IL-4. VCAM appears to be the most important ligand for the VLA-4 receptor, expressed at high levels on circulating eosinophils (27).

The inflammatory responses induced by the high local secretion of cytokines in these models often result in the ultimate destruction of the transduced tumor cells. These findings have led to proposals for the injection of cytokine depots into surgically unresectable tumor masses as a modality of local antitumor therapy. The eosinophils composing the infiltrate in IL-4-transduced tumors are crucial for their ultimate elimination because they grow progressively in animals depleted of the eosinophils by systemic administration of monoclonal antigranulocyte antibodies (28). Over the past few years, numerous reports have analyzed various biological effects of injections of tumors transduced with multiple different cytokine genes (summarized in Table 1). Among the most important features emphasized by all of these studies is that the local sustained release of cytokines produces dramatic local inflammatory effects without significant evidence of systemic effects or toxicity. While the pharmacokinetics of different cytokines obviously vary tremendously, it is rare to detect greater than 1 ng/ml cytokine in the serum of

Table 1 Cytokine genes that have been introduced into murine tumors

Cytokine References	*In vivo* effects of cytokine gene-transduced tumors
Interleukin 2 (22, 23, 51–53)	Expression of high levels of IL-2 results in regression of transduced tumors. Transduced tumors characterized by massive infiltrate of lymphocytic cells. In some tumor models, a systemic immune response is generated against challenge with parental tumor. Rejection of the IL-2-transduced tumor cells is dependent on $CD8^+$ and natural killer cells but not on $CD4^+$ cells, suggesting that helper T cells are rendered irrelevant in the rejection response. Correlation between increased levels of local IL-2 production and systemic as well as local antitumor responses.
Interleukin 4 (24, 25, 54)	Expression of high levels of IL-4 results in regression of transduced tumors. Transduced tumors characterized by massive infiltrate of macrophages and eosinophils. In some tumor models, a systemic immune response is generated against challenge with parental tumor that is greater than that generated by irradiated nontransduced tumor cells. Systemic antitumor responses are dependent on $CD8^+$ cells and partially on $CD4^+$ cells, suggesting enhanced presentation of tumor antigens by influxing macrophages to $CD4^+$ helper T cells as an important event in the ultimate stimulation of tumor-specific $CD8^+$ cytotoxic T lymphocytes.
Interferon γ (55-57)	Introduction of the IFN-γ gene into tumor cells generally induces or upregulates both MHC class I and MHC class II gene products. In some tumors, IFN-γ expression results in rejection of transduced tumors and induction of systemic immunity. The effects of IFN-γ are quite tumor-system dependent and in certain cases the cotransduction of IFN-γ with other cytokine genes actually reveals an inhibitory effect of IFN-γ in the generation of systemic immune responses.

(*continued*)

mice, even after injection of 1×10^7 transduced cells secreting high amounts of cytokine.

Vaccine Effects of Cytokine Gene–Transduced Tumor Cells

In many instances, in addition to the local tumoricidal inflammatory effect, injection of cytokine-secreting tumor cells generates systemic immunologic responses capable of protecting animals from challenge with the same tumor at a distant site. Originally, the introduction of IL-2 genes into tumor cells was based on the hypothesis that the often observed failure of the immune system to eliminate tumors that arise de novo results from a failure of T cell help. Using the murine CT26 colon carcinoma model in BALB/c mice, Fearon et al sought to "bypass" the helper immune response by inoculating mice with CT26 cells transfected with the IL-2 gene (22). In vivo depletion of T cell subsets with monoclonal antibodies demonstrated that $CD4^+$ cells were not critical for the rejection of either the transduced tumor vaccine or the systemic immunity that protected the animals from challenge with parental tumor. However, one consequence of bypassing the Th response in that system was a failure to es-

Table 1 *(continued)*

Cytokine References	*In vivo* effects of cytokine gene-transduced tumors
Tumor necrosis factor (58, 59)	TNF-transduced tumor cells typically grow more slowly in vitro and are sometimes rejected when injected into syngeneic animals. It is unclear whether the rejection phenomenon is due simply to the direct effects of TNF on the tumor cells or whether there are additional effects of TNF on inflammatory cells such as macrophages. Immunization with TNF-transduced tumor cells does not generate enhanced systemic immunity relative to irradiated nontransduced tumor cells.
Interleukin 6 (60)	Pliomorphic local inflammatory infiltrate consisting of both monocytic and lymphocytic cells. Moderate vaccine effect even with poorly immunogenic tumors.
Interlukin 7 (61)	Systemic anti-tumor immune responses have been reported with an MHC class II^+ myelomacytoma line by immunization with tumor cells engineered to secrete IL-7. Immunity was independent of $CD8^+$ T cells but dependent on $CD4^+$ T cells and $CR3^+$ cells—presumably macrophages.
GM-CSF (31, 38, 50)	GM-CSF transduced cells induce long-lived systemic antitumor immunity relative to irradiated nontransduced tumors in a number of different tumor models. Immunity dependent on both $CD4^+$ and $CD8^+$ T cells, despite the fact that the tumors were MHC class II^-. Potency of Gm-CSF's effect locally may relate to its unique ability in promoting the differentiation of hematopoietic precursors to dendritic cells.
Interleukin 3 (29)	Local inflammatory infiltrate similar to Gm-CSF transduced tumors. Systemic immunity dependent on both $CD4^+$ and $CD8^+$ T cells.
MCP-1 (52)	Locally inflammatory infiltrate was characterized by large numbers of macrophages. No enhanced systemic immunity documented.
G-CSF (63)	Local inflammatory infiltrate was characterized by large numbers of macrophages. No enhanced systemic immunity documented.

tablish long-lasting immunity to secondary tumor challenges (i.e. a failure of immunologic memory).

A recent study demonstrated distinct mechanisms of immune response generation by different cytokines expressed in a paracrine fashion. $CD4^+$ T cells were necessary for generating CTL by IL-3-transduced but not IL-2-transduced tumors, thus confirming a notion that IL-2 could bypass T cell help (29). Other studies with murine sarcoma models engineered to secrete IL-2 found that regressions of primary tumor inocula were mediated by $CD8^+$ cells and NK cells but not by $CD4^+$ cells (30). In contrast to most of the IL-2-transduction experiments, studies with tumor vaccines secreting other helper cytokines such as IL-3, IL-4, and GM-CSF indicate that Th cells have not been bypassed but instead are recruited into the antitumor response (25, 29, 31). In these cases, systemic immunity depends on the presence of both $CD4^+$ and $CD8^+$ cells at the time of vaccination and persists for at least 100 days.

Vaccination with GM-CSF–Secreting Tumors—A Role for Dendritic Cells in Paracrine Cytokine Vaccines?

Because of the wide range of local inflammatory and vaccine effects of cytokine-secreting tumors as well as other parameters (such as secretion rate) affecting experimental outcome, a study was done using retroviral vectors to screen the immunologic effects of a wide range of cytokine genes introduced into tumor cells (31). The retroviral vector used was a Moloney MuLV-based vector that does not contain any selection genes and that produces consistent expression levels for different cDNA inserts. B16-F10 cells, a poorly immunogenic C57BL/6-derived murine melanoma, were infected with vectors containing the following genes: IL-2, IL-4, IL-5, IL-6, γ-IFN, IL-1, Rantes, GM-CSF and α-TNF. C57BL/6 mice were injected with the various B16-F10 infectants and challenged with live wild-type cells 2 weeks later. The cytokine gene that stood out as being most potent in the protection assays was GM-CSF.

The cellular infiltrate in GM-CSF-transduced B16-F10 tumors was characterized by immature appearing, predominantly mononuclear cells and few T cells. Similar in effect to vaccines that produced IL-3 and IL-4, both $CD4^+$ and $CD8^+$ elimination completely abrogated the animals' ability to reject wild-type tumor challenges. $NK1.1^+$ cells had no effect. To further distinguish the role of $CD4^+$ cells, subset depletions were performed 2 days prior to wild-type challenge but 12 days after immunization with B16-F10-GM-CSF. In this case, both $CD4^+$ and $CD8^+$ depletion again abrogated tumor rejection.

The proposed mechanism by which administration of paracrine GM-CSF enhances tumor-specific immunity is shown in Figure 1. GM-CSF has long been known to induce the differentiation of bone marrow–derived cells such as macrophages that are important antigen-presenting cells. The most relevant recent advance in our understanding of GM-CSF function relates to its role in the differentiation and maintenance of dendritic cells (32–34). The first identification of a role for GM-CSF in dendritic function resulted from its identification as the keratinocyte-derived factor necessary for inducing differentiation of epidermal Langerhans cells into potent antigen-presenting cells. Subsequently, GM-CSF was shown to be an important factor in the in vitro maintenance of dendritic cells. More recently, GM-CSF has been identified as a critical factor inducing the differentiation of primitive hematopoietic precursors into dendritic cells as a lineage distinct from macrophages and granulocytes. This in vitro differentiation generally requires at least six days of culture in the presence of GM-CSF.

In the case of humans, immature $CD34^+$ cells derived from peripheral blood can likewise be induced to develop into dendritic cells under the influence of GM-CSF (35, 36). In certain cases, additional cytokines appear to synergize with GM-CSF. For example, in the human, TNFα is reported to be an important cofactor with GM-CSF for maximal dendritic cell differentiation. In murine

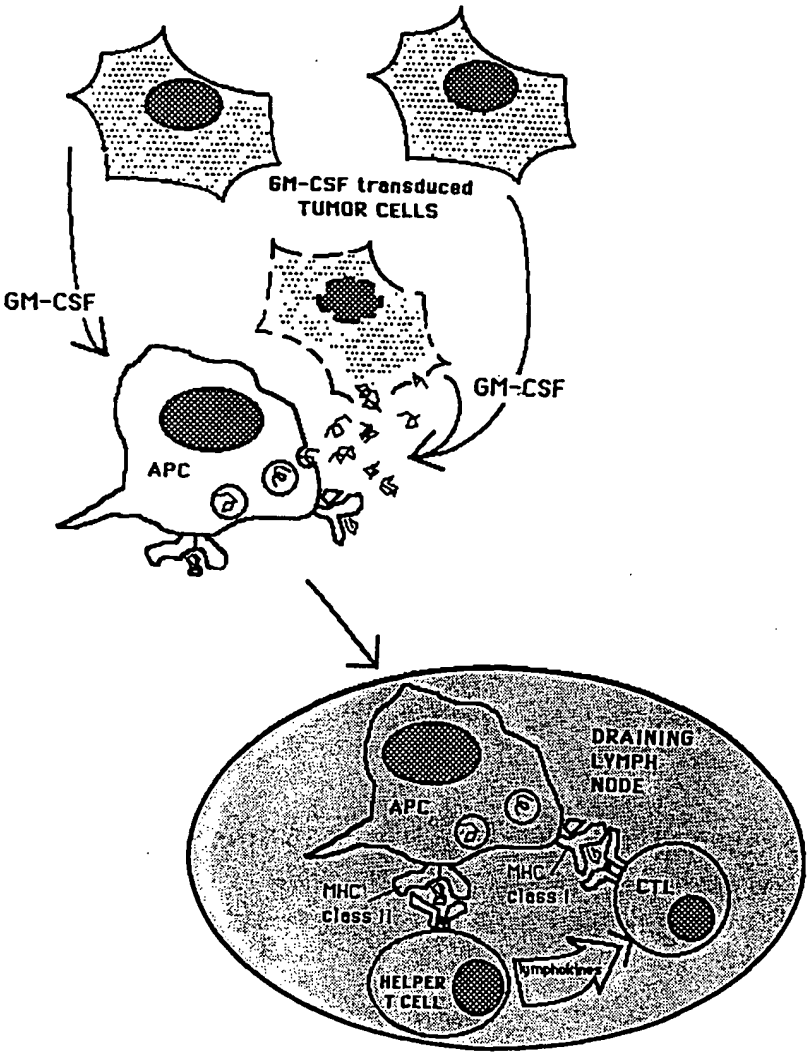

Figure 1 Proposed mechanism for activation of tumor antigen–specific T cells by cytokine gene–transduced tumor vaccines.

The example shown is a GM-CSF transduced tumor vaccine that is particularly effective in inducing systemic protection against tumor challenges (see text). The transduced tumor represents a timed release depot for both its own antigens and GM-CSF. The high local GM-CSF concentrations induce the in situ differentiation of hematopoietic progenitors into many lineages, including potent APC such as dendritic cells. These activated APC pick up tumor antigens released into the tissue space as the tumor disintegrates. They then migrate to draining lymph nodes while processing the antigens into both MHC class I- and MHC class II-restricted epitopes. Once in the lymph nodes, the antigens are presented to both $CD4^+$ and $CD8^+$ T cells. The ability of bone marrow–derived APCs to present both MHC class I- and MHC class II-restricted epitopes provides for the activation of $CD4^+$ and $CD8^+$ precursors in proximity to each other, thereby allowing for more efficient CD4-CD8 cooperation via lymphokines.

models, IL-4 synergizes with GM-CSF in the most efficient induction of differentiation to the dendritic cell phenotype (37). The dendritic cells that result from culture of hematopoietic progenitors in GM-CSF appear to have similar antigen-presenting cell function as purified mature dendritic cells. That is, they are between two and three orders of magnitude more potent in stimulating helper T cell responses in standard assays of nominal antigen presentation or in MLR assays. These cells express significantly higher levels of both MHC class I and MHC class II molecules as well as high levels of costimulatory molecules such as B7 and also high levels of cell adhesion molecules such as ICAM. It is these features as well as other undefined characteristics that make dendritic cells such uniquely potent antigen-presenting cells. Because dendritic cells have been thought to be the primary cell necessary for activating virgin T cells, their role in priming immunologic responses is now considered central. As mentioned above, while it is yet to be proven that the unique enhanced immunologic effect of paracrine GM-CSF in the B16 F10 and other tumor models relates specifically to its role in inducing local dendritic cell differentiation at the vaccine site, the in vitro studies certainly point to this cell type as an important component of the in vivo effect.

The Role of Bone Marrow–Derived Antigen-Presenting Cells in the Priming of Tumor-Specific T Cells

As described above, most of the cytokine gene–transduced tumors are characterized by infiltrates of cells predominantly characteristic of APCs rather than lymphocytes. In the case of priming of $CD4^+$ cells, these APCs are likely to ingest MHC class II–restricted tumor antigens for processing and presentation. The best experimental evidence for this scenario comes from the B16F10-GM/CSF vaccine studies. B16F10 is MHC class II^- and cannot be induced to express MHC class II molecules even after γ-interferon treatment. Thus, the activation of tumor-specific $CD4^+$ cells inferred from the CD4 depletion experiments can only have occurred via representation of tumor antigens by a third party MHC class II^+ APC.

Most likely, efficient priming of antitumor immune responses results from collaboration between tumor-specific $CD4^+$ cells and $CD8^+$ cells activated in proximity to each other. In many of the described tumor vaccine models, the requirement for colocalized activation of helper and CTLs presents an apparent paradox. Although T cell priming is thought to take place in the lymph nodes draining the vaccine site, tumor cells are rarely found in these draining lymph nodes. In the case of MHC class II–restricted $CD4^+$ T cell priming, APCs pick up antigens in the extracellular space and carry them to the draining lymph nodes where they are processed and presented to T cells. The notion that host-derived APCs could efficiently ingest exogenous antigens for processing and presentation on MHC class I to $CD8^+$ cells in vivo had been

considered improbable because the defined cellular pathways of MHC class I antigen presentation require that the antigen be expressed endogenously. To address the issue of MHC class I–restricted tumor antigen tumor presentation during priming with tumor vaccines, Huang et al designed a model system in which a specific antigen (influenza NP) with known MHC class I epitopes was expressed by the tumor (38). Parent ⟶ F1 chimeras, in which the MHC haplotypes of bone marrow–derived cells either did or did not match the MHC haplotype of the tumor cell, were vaccinated with genetically modified tumors expressing the NP antigen. In all cases, the NP-specific CTLs generated were specific exclusively for epitopes presented by MHC haplotype expressed by the bone marrow–derived cells, not by the tumor cell. Thus, the priming of MHC class I–restricted responses involves a transfer of that antigen to a host bone marrow–derived cell before its presentation to $CD8^+$ T cells (Figure 1).

As yet, no clearly defined mechanism exists by which exogenous antigens can efficiently enter the class I compartment. However, a subset of macrophages can present exogenous antigens on MHC class I to $CD8^+$ T cell clones in vitro (39, 40). Although this protein has been postulated to function normally in the intracellular transfer of antigens onto nascent MHC class I molecules, it may also serve to efficiently transfer class I–restricted peptide antigens to other cells in vivo.

VACCINE DESIGN WITH POLYMER-CONTROLLED DELIVERY OF CYTOKINES

While numerous experimental studies have been performed in murine models with cytokine-transduced tumors, a major limitation in the translation of this strategy to large-scale human tumor vaccine therapy is the labor intensity and variability of establishing each individual tumor in culture and transducing it with appropriate vectors. Polymer-controlled drug delivery systems, which have improved the success rate of certain drug therapies, are now being explored using bioactive proteins as a localized sustained delivery modality (41). The controlled release technology therefore potentially offers a technically simpler strategy to achieve paracrine cytokine production in tumor vaccines.

Based on the studies demonstrating the efficacy of local GM-CSF production in the induction of systemic antitumor immune responses, Golumbek et al evaluated the ability of GM-CSF-containing microspheres to act as an adjuvant when mixed with irradiated tumor cells prior to immunization (42). For these studies, a complex coacervation procedure was used to produce microspheres whose matrix consisted of gelatin and chondroitin sulfate. GM-CSF was added during the coacervation, and the microspheres were stabilized by glutaraldehyde cross-linking. In initial vaccine studies, GM-CSF-containing microspheres mixed at a one-to-one ratio with irradiated B16-F10 melanoma cells together produced vaccine effects equivalent to the GM-CSF-transduced

B16-F10. Intermingling with the tumor cells was critical for the vaccine effect. When tumor cells are mixed with blank microspheres, which produce only weak vaccination, a lymphocytic infiltrate was observed. However, the vaccine site infiltrate into the GM-CSF-containing microspheres was identical to that seen in GM-CSF-transduced tumor vaccines.

These results provide preliminary evidence establishing biodegradable microspheres with encapsulated cytokines as a potential strategy for paracrine cytokine delivery in tumor vaccine development. A modified utilization of polymer sustained release technology involves coincorporation of cytokines and specific recombinant protein antigens. A version of this approach, in which the cytokine IL-12 was incorporated into an oil-based adjuvant as part of an experimental *Leishmania* vaccine, resulted in priming of therapeutic effects characterized by enhance Th1 responses to *Leishmanial* antigens (43).

CLINICAL APPLICATION OF PARACRINE CYTOKINE TUMOR VACCINES

There are several ongoing clinical trials employing genetically modified tumor vaccines for the treatment of patients with cancer. Cytokine gene–modified, autologous and allogeneic tumor cells are the predominant approaches being studied in patients with different histologic tumor types in phase I studies. While much has been learned about generating antitumor immune responses from cytokine-secreting vaccine strategies in mouse models, it is still not clear from these models which cytokine is the most potent for generating antitumor immune responses. There are at least two reasons for this. As mentioned above, of the many reports of priming by cytokine-secreting tumor vaccines, only one study made a direct comparison between different cytokines in the same tumor model system (31). But even direct comparisons between different cytokines in one or a few tumor model systems may not be enough to generalize these findings to different human tumors. Such comparison studies may eventually need to be done in clinical trials. In fact, it is quite possible that different cytokines generate different types of responses against histologically different tumors. Different cytokines have a range of functions of which some are known and some are still being discovered. It is therefore not surprising that different cytokines often generate different immune responses when employed in different tumor systems.

There are five critical parameters that need to be addressed in these early clinical cancer vaccine trials.

1. Method of gene transfer. Production of transduced autologous vaccines requires an efficient vector system because the majority of primary tumor explants do not establish stable cultures. Low-efficiency systems coupled to drug selection kill too many cells at the outset. Replication-defective

retroviral vectors are currently the most popular gene transfer vehicle (44, 45). Certain constructs produce high expression of the inserted cytokine gene that is very stable. More recently, there has been increasing interest in adenovirus-based vectors because of the high titers achievable. Also, adenovirus-based vectors do not integrate into the genome; thus, multiple episomal copies can produce high expression levels (46, 47). Disadvantages of this vector system include the relatively transient nature of gene expression as well as partial replication competence of E1a-vectors. Nonviral gene transfer systems of many varieties are currently under development.

2. The total number of tumor cells expressing antigen that are needed for generating an effective antitumor immune response. In all preclinical models in which vaccine cell number has been evaluated, increasing the number of vaccinating cells seems to increase the potency of systemic immunity. Widening the distribution of vaccine injections also enhances systemic immunity (48).

3. The concentration of cytokine expressed that is required for generating an effective antitumor immune response. The importance of concentration of cytokine expression appears to depend on the particular cytokine. In the case of IL-4, increasing amounts seem to correlate with increased systemic immunity. A biphasic curve exists for IL-2-secreting tumor vaccines in which immunization potency first increases and then decreases at the highest secretion rates. In the case of GM-CSF, maximal immunity plateaus at a secretion rate of 36 ng/10^6 cells/24 h (48).

4. The route of administration of the vaccine that is most effective at generating an effective antitumor immune response. It is difficult to completely analyze routes of injection in preclinical models because the dermis of rodents is too thin to place large numbers of cells. However, studies using soluble GM-CSF to treat cutaneous leprosy suggest that the dermal route of injection is superior. This may be due to the presence of Langerhans cells, which are induced by GM-CSF to differentiate into potent antigen-presenting cells (49, 50). The optimal route of administration may differ for different histologic types of tumors, and, therefore, this question should be adequately addressed, both in preclinical models and in clinical trials.

5. Methods of assuring that reintroduced tumor cells do not themselves replicate and cause morbidity. As described above, many of the gene products of the transduced tumor vaccines—particularly the cytokines—generate a local inflammatory response that eventually destroys the transduced tumor. However, this result is highly variable and dependent on levels of cytokine, tumor type, and cell dose. Also, for different cytokines, relative efficiency

of elimination of the transduced tumor does not correlate with relative potency of the systemic immunity against distant sites of tumor—the only clinically relevant feature. For the ultimate use of genetically modified tumor vaccines in low tumor burden patients, additional safeguards must be employed. The most feasible and reliable method of inactivating the vaccine cells is radiation. For essentially all tumors, it is possible to find a window of γ irradiation dose that maintains metabolic activity of the tumor for a few days while inhibiting replication. In the case of GM-CSF transduced tumors, γ irradiation does not impair the generation of systemic immunity.

Clinical vaccine trials employing ex vivo transduced tumor cells can be divided into two general types—transduction of autologous tumor cells versus use of a transduced allogeneic tumor line. The autologous tumor vaccine strategies require that either the patient's primary tumor or a metatastic site is surgically excised followed by introduction of the gene in vitro. This strategy has the advantage that an individual's own tumor cells have the greatest chance to vaccinate against the spectrum of relevant tumor antigens. As discussed above, most of the gene transfer techniques require at least a short term of culture tumor cells, during which time subselection of tumor cells and loss of antigens may occur.

An example of one trial utilizing transduced autologous tumor vaccines has been initiated for patients with stage IIIb or IV renal cell carcinoma. Patients undergo nephrectomy to obtain the primary tumor for vaccine production. The primary tumor is used for vaccine because of the theoretical concern that different metastases, each of which probably arises from a different clone of the primary tumor, express a different set of tumor-specific antigens, whereas the primary tumor is most likely to express the entire range of tumor antigens found on all of the distant metastases. Following surgery, genetic modification of the renal tumor cells is performed using the Moloney-based MFG retroviral vector containing the human GM-CSF gene following initial expansion of the enzymatically dissociated tumor cells. Once expansion and transduction are completed, the vaccine cells are γ-irradiated with 15,000 rad and frozen in liquid nitrogen until the day the patient is to be treated.

The major disadvantage of autologous gene-modified tumor vaccines relates to the labor intensity and variability in gene transfer for cultures derived from primary tumor explants. The use of allogeneic vaccines certainly decreases the labor intensity and variability of vaccine production. With this strategy, a single standardized transduced cell line or mixture of transduced cell lines is used for the vaccine. Critical to any chance of success with a transduced allogeneic tumor vaccine is that the cells share antigens with the patient's tumor. Human melanomas appear to share a number of critical antigens recognized by T cells. Whether such will be the case with other human tumors is unknown at this point. In addition, a critical component of T cell recognition is the MHC allele.

Different HLA alleles will present different peptides from the same protein. For this reason, the majority of allogeneic tumor vaccines seek to match at least one HLA-A2. HLA-A2 is expressed by 50% of Caucasians, and therefore, an HLA-A2+ allogeneic vaccine would be applicable for 50% of such patients. Interestingly—because it appears for most tumor vaccines that the tumor cell itself does not present its own MHC class I–restricted antigens during priming of the immune response during vaccination—it may not be necessary that the allogeneic tumor express the same HLA allele as the patient. It is, however, critical that the allogeneic tumor line expresses antigens that are shared with the patient's tumor.

CONCLUSION

As both genetic and biochemical techniques successfully identify the molecular targets of antitumor responses, it may one day be possible to produce generic cancer vaccines that do not require an individual's tumor cells as a component of the vaccine. Nonetheless, strategies that produce high levels of specific cytokines local to the site of antigen represent a promising new approach to stimulate immune responses with the appropriate characteristics to be more effective against tumors as well as certain infectious diseases.

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uviometer (u″ve-om′ĕ-ter) an instrument for measuring ultraviolet emanation.

uvioresistant (u″ve-o-re-zis′tant) resistant to or not affected by ultraviolet rays.

uviosensitive (u″ve-o-sen′sĭ-tiv) sensitive to ultraviolet rays.

uvula (u′vu-lah), pl. *u′vulae* [L. "little grape"] a pendent, fleshy mass; used as a general term in anatomical terminology. Usually used alone to designate the *uvula palatina*. **bifid u.**, a split uvula. **u. of bladder,** u. vesicae. **u. cerebel′li, u. of cerebellum,** u. vermis. **u. fis′sa,** a forked or split uvula. **Lieutaud's u.,** u. vesicae. **u. palati′na** [NA], **palatine u.,** the small, fleshy mass hanging from the soft palate above the root of the tongue, composed of the levator and tensor palati muscles and the muscle of the uvula, connective tissue, and mucous membrane. **u. ver′mis** [NA], the part of the vermis of the cerebellum between the pyramis and the nodulus; called also *u. of cerebellum*. **u. vesi′cae** [NA], a rounded elevation at the neck of the bladder, formed by convergence of many fibers of the trigonal muscle as they pass through the encircling musculus sphincter vesicae to terminate in the urethra. Called also *u. of bladder*.

uvulaptosis (u″vu-lap-to′sis) uvuloptosis.

uvular (u′vu-lar) pertaining to the uvula; staphyline.

uvularis (u″vu-la′ris) [L.] uvular.

uvulatome (u′vu-lah-tōm) uvulotome.

uvulatomy (u″vu-lat′o-me) uvulotomy.

uvulectomy (u″vu-lek′to-me) [*uvula* + Gr. *ektomē* excision] excision of the uvula; cionectomy.

uvulitis (u″vu-li′tis) [*uvula* + *-itis*] inflammation of the uvula; staphylitis.

uvuloptosis (u″vu-lop-to′sis) [*uvula* + Gr. *ptōsis* falling] falling of the palate: a relaxed and pendulous condition of the palate; staphyloptosia.

uvulotome (u′vu-lo-tōm) an instrument for cutting the uvula; staphylotome.

uvulotomy (u″vu-lot′o-me) [*uvula* + Gr. *tomē* a cutting] the operation of cutting off the uvula or a part of it.

uzara (u-zah′rah) the dried root of a species of *Gomphocarpus* (Asclepiadaceae), an African plant; used by certain natives in diarrhea and dysentery. It is the source of uzarin.

uzarin (u-zar′in) a constituent of uzara, $C_{35}H_{54}O_{14}$, which has antidiarrheal properties.

V

V chemical symbol for *vanadium*.

V. *Vibrio;* vision; visual acuity.

v. abbreviation for L. *vena* vein, and for *volt*.

V_T symbol for *tidal volume* (in pulmonary ventilation).

VA visual acuity.

V.A. Veterans Administration.

vaccigenous (vak-sij′ĕ-nus) [*vaccine* + Gr. *gennan* to produce] producing vaccine.

vaccin (vak′sin) vaccine.

vaccina (vak-si′nah) vaccinia.

vaccinable (vak-sin′ah-b'l) susceptible of being successfully vaccinated.

vaccinal (vak′sĭ-nal) [L. *vaccinus*] 1. pertaining to vaccinia, to vaccine, or to vaccination. 2. having protective qualities when used by way of inoculation.

vaccinate (vak′sĭ-nāt) to inoculate with vaccine for the purpose of producing immunity.

vaccination (vak″sĭ-na′shun) [L. *vacca* cow] the introduction of vaccine into the body for the purpose of inducing immunity. Coined originally to apply to the injection of smallpox vaccine, the term has come to mean any immunizing procedure in which vaccine is injected. **smallpox v.,** the application of smallpox vaccine upon the denuded or scarified skin, to produce immunity to smallpox.

vaccinationist (vak″sĭ-na′shun-ist) one who defends the practice of vaccination.

vaccinator (vak′sĭ-na″tor) 1. one who vaccinates. 2. an instrument for use in vaccination.

vaccine (vak′sēn) [L. *vaccinus*] a suspension of attenuated or killed microorganisms (bacteria, viruses, or rickettsiae), administered for the prevention, amelioration, or treatment of infectious diseases. **anthrax v.,** anthrax cultures attenuated by growing them at 42° C. for varying lengths of time and injected into horses, cattle, sheep, and goats to protect them against anthrax. It is a triple vaccine: No. 1 is the weakest and is given first; Nos. 2 and 3 are progressively stronger and are given after intervals of twelve days. **antirabic v.,** rabies v. **antityphoid v.,** typhoid v. **attenuated v.,** a vaccine prepared from live microorganisms or viruses cultured under adverse conditions leading to loss of their virulence but retention of their ability to induce protective immunity. **autogenous v.,** a vaccine prepared from microorganisms which have been freshly isolated from the lesion of the patient who is to be treated with it. **avian embryo v.,** a vaccine prepared from embryonate avian eggs infected with inactivated fixed virus. **bacterial v.,** a standardized suspension of attenuated or killed bacteria which is injected subcutaneously, intramuscularly or intradermally, to increase the patient's immunity to the organisms injected, or sometimes for pyrogenetic effects in treatment of certain noninfectious diseases. **BCG v.** (bacille Calmette-Guérin) [USP], a preparation used as an active immunizing agent against tuberculosis, consisting of a dried, living culture of the Calmette-Guérin strain of *Mycobacterium bovis*, which is grown on a suitable medium from a seed strain of known history that has been maintained to preserve its capacity for conferring immunity. It is usually administered intradermally, but may also be given by multiple punctures with a special instrument, or by scarification through a suspension, applied to the skin. Called also *Calmette's v.* and *tuberculosis v.* **brucellosis v.,** a vaccine made from an avirulent variant of *Brucella abortus*, said to reduce the incidence of bovine brucellosis. **Calmette's v.,** BCG v. **caprinized v.,** a vaccine prepared from microorganisms that have been attenuated by passage in goats. **cholera v.** [USP], a sterile suspension, in isotonic sodium chloride solution or other suitable diluent, of killed cholera vibrios (*Vibrio cholerae*), prepared from equal portions of suspensions of cholera vibrios of the Inaba and Ogawa strains, and containing, at the time of manufacture, 8 billion cholera vibrios in each milliliter. Used as an active immunizing agent against cholera, it is administered subcutaneously or intramuscularly. **Cox v.,** typhus v. **crystal violet v.,** a vaccine prepared from the virus of hog cholera in pig's blood, attenuated by exposure to the dyestuff crystal violet; used for immunizing young pigs against hog cholera. **diphtheria v.,** see under *toxoid*. **diphtheria and tetanus toxoids and pertussis v.** [USP], a sterile suspension of killed *Bordetella pertussis* in a mixture of diphtheria toxoid and tetanus toxoid, the components being combined in such proportions as to yield a mixture that meets the antigenic and other requirements of each separate component; used as an active immunizing agent, administered subcutaneously. **diphtheria and tetanus toxoids and pertussis v. adsorbed** [USP], a sterile suspension of the precipitate obtained by treating a mixture of diphtheria toxoid, tetanus toxoid, and pertussis vaccine with alum, aluminum hydroxide, or aluminum phosphate, the components being combined in such proportions as to yield a mixture containing an immunizing dose of each in the total dosage prescribed on the label; used as an active immunizing agent, administered intramuscularly. **duck embryo v.,** vaccine prepared from embryonate duck eggs infected with inactivated fixed virus. **glycerinated v.,** vaccine material purified by treatment with glycerin. **heterologous v.,** a vaccine that confers protective immunity against a pathogen not present in the vaccine, because it contains microorganisms that possess cross-reacting antigens which they share in common with that pathogen. For example, vaccinia virus protects against smallpox. Called also *heterotypic v.* **heterotypic v.,** heterologous v. **hydrophobia v.,** rabies v. **inactivated v.,** a vaccine containing nonreplicating microorganisms or viruses which are noninfectious but which retain their protective antigens. Viral vaccines are usually inactivated by agents such as formalin, phenol, or β-propiolactone; bacterial vaccines by heat, acetone, ultraviolet rays, formaldehyde, or phenol. **influenza virus v.** [USP], a sterile, aqueous suspension of suitably inactivated influenza virus prepared from the extraembryonic fluid of influenza virus–infected chick embryo; it may contain an adsorbent, such as aluminum phosphate or protamine. It is an active immunizing agent, administered intramuscularly or subcutaneously. **live v.,** a vaccine prepared from live microorganisms or viruses that have been attenuated but that retain their immunogenic properties. **measles virus v., inactivated,** an aqueous suspension of suitable measles virus grown on either chicken embryo or monkey renal tissue cultures and inactivated by a suitable method; it has been administered intramuscularly as an active immunizing agent but the live attenuated measles virus vaccine is usually preferred. **measles virus v., live attenuated** [USP], a bacterially sterile preparation of live virus derived from a strain of measles virus suitable for human immunization, grown on cultures of either chicken embryo or canine renal tissue cultures; used as an active immunizing agent, administered subcutaneously. **measles and rubella virus v., live** [USP], a bacterially sterile preparation of a combination of live measles and rubella viruses found suitable for human immuniza-

imidazolylethylamine (im″id-az″o-lil-eth″il-am′in) histamine.

imide (im′id) any compound containing the bivalent group, >NH, to which are attached only acid radicals.

imido- (ĭ-me′do) a prefix denoting the presence in a compound of the bivalent group >NH attached to two acid radicals.

imidocarb hydrochloride (ĭ-mid′o-karb) chemical name: *N,N′*-bis[3-(4,5-dihydro-1*H*-imidazol-2-yl)phenyl] urea dihydrochloride; an antiprotozoal effective against *Babesia*, $C_{19}H_{20}N_6O \cdot 2HCl$.

imidogen (ĭ-me′do-jen) the bivalent radical >NH.

iminazole (im″in-az′ōl) imidazole.

imino- (ĭ-me′no) a prefix used to denote the presence of the bivalent group >NH attached to nonacid radicals.

iminoglycinuria (ĭ-me″no-gli″sin-u′re-ah) a benign hereditary disorder of renal tubular reabsorption of glycine and imino acids (proline and hydroxyproline), marked by excessive levels of all three substances in the urine.

iminourea (ĭ-me″no-u-re′ah) guanidine.

imipramine hydrochloride (ĭ-mip′rah-mēn) [USP] chemical name: 10,11-dihydro-*N,N*-dimethyl-5*H*-dibenz[*b,f*]azepine-5-propanamine monohydrochloride. A tricyclic antidepressant, $C_{19}H_{24}N_2 \cdot HCl$, occurring as a white to off-white, crystalline powder; used especially in the treatment of endogenous depression and in childhood enuresis, administered orally.

Imlach's fat plug (im′laks) [Francis *Imlach*, Scottish physician, 1819–1891] see under *plug*.

immature (im″ah-tūr′) [L. *in* not + *maturus* mature] unripe or not fully developed.

immediate (ĭ-me′de-it) [L. *in* not + *mediatus* mediate] direct; with nothing intervening; occurring without delay.

immedicable (ĭ-med′ĭ-kah-b'l) [L. *immedicabilis*] beyond the hope of cure.

immersion (ĭ-mer′shun) [L. *immersio*] 1. the placing or plunging of a body into a liquid. 2. the use of the microscope with the object and object glass both covered with a liquid. **homogeneous i.**, the employment in microscopy of a liquid of nearly the same refractive power as the cover glass. **oil i.**, the covering of the microscopical objective and the object with oil. **water i.**, the covering of the microscopical objective and the object with water.

immiscible (ĭ-mis′ĭ-b'l) not susceptible to being mixed.

immobility (im″mo-bil′ĭ-te) 1. the state of being immovable. 2. chronic hydrocephalus of cattle.

immobilization (im-mo″bil-i-za′shun) the act of rendering immovable, as by a cast or splint.

immobilize (im-mo′bil-īz) [L. *in* not + *mobilis* movable] to render incapable of being moved, as by a cast or splint.

Immu-G (im′u-je) trademark for a preparation of immune globulin.

immune (ĭ-mūn′) [L. *immunis* free, exempt] 1. being highly resistant to a disease because of the formation of humoral antibodies or the development of cellular immunity, or both, or as a result of some other mechanism, as interferon activity in viral infections. 2. characterized by the development of humoral antibodies or cellular immunity, or both, following antigenic challenge. 3. produced in response to antigenic challenge, as immune serum globulin. 4. an immune individual.

immunifacient (ĭ-mu″nĭ-fa′shent) producing immunity; said of diseases, such as diphtheria and typhoid, which for a time after infection produce immunity against themselves.

immunifaction (ĭ-mu″nĭ-fak′shun) immunization.

immunisin (ĭ-mu′nĭ-zin) antibody.

immunity (ĭ-mu′nĭ-te) [L. *immunitas*] 1. the condition of being immune; security against a particular disease; nonsusceptibility to the invasive or pathogenic effects of foreign microorganisms or to the toxic effect of antigenic substances. Called also *functional* or *protective i.* See also *active i.*, *nonspecific i.*, and *passive i.* 2. heightened responsiveness to antigenic challenge that leads to more rapid binding or elimination of antigen than in the nonimmune state; it includes both humoral and cell-mediated immunity. 3. the capacity to distinguish foreign material from self, and to neutralize, eliminate, or metabolize that which is foreign by the physiologic mechanisms of the immune response. **acquired i.**, specific immunity attributable to the presence of antibody and to a heightened reactivity of antibody-forming cells, specifically immune lymphoid cells (responsible for cell-mediated immunity), and of phagocytic cells, following prior exposure to an infectious agent or its antigens, or passive transfer of antibody or immune lymphoid cells; called also *adaptive i.* **active i.**, acquired immunity attributable to the presence of antibody or of immune lymphoid cells formed in response to antigenic stimulus. **actual i.**, active i. **adoptive i.**, passive immunity of the cell-mediated type conferred by the administration of sensitized lymphocytes from an immune donor. **antibacterial i.**, immunity against the action of bacteria, i.e., the ability to resist infection by bacteria. **antiblastic i.**, immunity due to forces antagonistic to the growth of the microorganism in the body of the host organism. **antitoxic i.**, immunity against toxins, attributable to the presence of specific antitoxin(s) in the immune individual. **antiviral i.**, immunity against viruses. **artificial i.**, acquired (active or passive) immunity produced by deliberate exposure to an antigen, as in vaccination. **athreptic i.**, an obsolete concept attributing immunity to exhaustion of bacterial foodstuffs from the growth medium. **bacteriolytic i.**, antibacterial immunity attributable to the lytic action of sera. **cell-mediated i., cellular i.**, specific acquired immunity in which the role of small lymphocytes of thymic origin (T-lymphocytes) is predominant; it is responsible for resistance to infectious diseases caused by certain bacteria, fungi, and viruses, certain aspects of resistance to cancer, delayed hypersensitivity reactions, certain autoimmune diseases, and allograft rejection, and plays a role in certain allergies. **community i.**, herd i. **congenital i.**, the immunity which an individual possesses at birth. **cross i.**, immunity produced by inoculation with an agent (e.g., a bacterium or virus) that is different from, but closely related to, the agent causing the disease. **familial i.**, genetic i. **genetic i.**, innate i. **herd i.**, the resistance of a group to attack by a disease because of the immunity of a large proportion of the members and the consequent lessening of the likelihood of an affected individual coming into contact with a susceptible individual. **humoral i.**, acquired immunity in which the role of circulating antibodies (immunoglobulins) is predominant; these antibodies are products of B-lymphocytes and plasma cells. **infection i.**, resistance to infection by reason of an already existing infection by the same or an antigenically related microorganism. **inherent i.**, innate i. **inherited i.**, innate i. **innate i.**, immunity based on the genetic constitution of the individual; natural immunity. Called also *genetic i.*, *inherent i.*, and *inherited i.* **intrauterine i.**, passive immunity acquired by the fetus as a consequence of the passage of maternal IgG antibodies from an immune mother through the placenta into the fetal circulation. **local i.**, immunity manifested predominantly in a restricted anatomical region or type of tissue; antibodies of the class termed secretory or exocrine IgA account for many manifestations of local immunity. **maternal i.**, passively transferred humoral immunity from the mother to the offspring, across the placenta before birth in primates, from the colostrum in ungulates via the intestines, and from the egg yolk in birds. **maturation i.**, increase in resistance to disease that comes with development to maturity. **mixed i.**, passive immunity succeeded by active immunity as a consequence of serovaccination. **native i.**, nonspecific immunity due to the genetic endowment of the host. **natural i.**, the capacity of the normal (not specifically immunized) animal to respond immunologically; immunity inherited or acquired passively *in utero* or through the maternal milk, or acquired actively by clinical or subclinical infection. **nonspecific i.**, immunity arising from the sum of immune responses that do not involve antigenic stimulation of antibody formation or cell-mediated immunity; it includes lysozyme and interferon activity, phagocytosis, the inflammatory response, and chemical and physical barriers to infection. **nutritional i.**, immunity postulated to result from the withholding by host cells of an essential nutrilite (e.g., iron) from invading pathogens. **opsonic i.**, immunity due to the presence of opsonins. **passive i.**, acquired immunity produced by the administration of preformed antibody or specifically sensitized lymphoid cells. **phagocytic i.**, immunity attributable to the activity of phagocytes in the engulfment and destruction of the agents producing disease. **placental i.**, intrauterine i. **postoncolytic i.**, immunity to tumor development following regression of a previously existing tumor. **preemptive i.**, interference phenomenon, def. 2. **Profeta's i.**, the alleged immunity against syphilitic infection possessed by some children of syphilitic parents. **racial i.**, genetically determined resistance that all or most of the members of a race manifest toward a certain infection. **residual i.**, immunity which remains for varying periods after the complete disappearance of the infection. **species i.**, resistance of members of a particular species to a disease; immunity enjoyed by members of a particular species and determined by their genetic constitution. **specific i.**, immunity against a particular disease, e.g., scarlet fever, or against a particular antigen. **sterile i.**, that in which the immune response results in complete removal of the infectious agent from the host, or in removal to the point that the agent is no longer detectable in the host. **tissue i.**, local i. **toxin-antitoxin i.**, an active antitoxic immunity produced by injecting subcutaneously a nearly neutral mixture of diphtheria toxin and antitoxin.

immunization (im″u-ni-za′shun) the process of rendering a subject immune, or of becoming immune. **active i.**, stimulation with a specific antigen to induce an immune response. **collateral i.**, inoculation with an organism other than the one causing an existing infection. **isopathic i.**, active i. **occult i.**, immunization produced in some unknown, spontaneous way. **passive i.**, the conferral of specific immune reactivity on previously nonimmune individuals by the administration of sensitized lymphoid cells or serum from immune individuals. **Rh i., rhesus i.**, see under *sensitization*. **side-to-side i.**, an immunization method in which the antigen is injected into one side of the body and the corresponding antibody into the other side.

158 F.3d 1243
48 U.S.P.Q.2d 1117
(Cite as: 158 F.3d 1243)

▷

United States Court of Appeals,
Federal Circuit.

RENISHAW PLC, Plaintiff-Appellant,
v.
MARPOSS SOCIETA' PER AZIONI and Marposs Corporation, Defendants-Appellees.

No. 98-1007.

Sept. 16, 1998.
Rehearing Denied; Suggestion for Rehearing In Banc Declined Nov. 18, 1998.

Patentee brought action against competitor for infringement of patents for touch probes. Following bench trial, the United States District Court for the Eastern District of Michigan, Paul V. Gadola, J., 974 F.Supp. 1056, entered judgment for competitor, and patentee appealed. The Court of Appeals, Clevenger, Circuit Judge, held that: (1) in claim limitation requiring that probe generate a trigger signal when sensing tip contacted an object and stylus holder was thereby deflected relative to housing, term "when" meant as soon as contact was made and deflection occurred, not at some appreciable time thereafter, and (2) patent was not literally infringed.

Affirmed.

West Headnotes

[1] Patents ⇐226.6
291k226.6 Most Cited Cases

Patent infringement analysis is a two-step process in which court first determines the correct claim scope, and then compares the properly construed claim to the accused device to determine whether all of the claim limitations are present either literally or by a substantial equivalent.

[2] Patents ⇐324.5
291k324.5 Most Cited Cases

Court of Appeals reviews determination of patent claim's scope without deference to the trial court and reviews comparison of properly construed claim to accused device for clear error when infringement is tried to the bench.

[3] Patents ⇐99
291k99 Most Cited Cases

A patent claim must explicitly recite a term in need of definition before a definition may enter the claim from the written description, because the claims define the scope of the right to exclude; the claim construction inquiry, therefore, begins and ends in all cases with the actual words of the claim.

[4] Patents ⇐159
291k159 Most Cited Cases

[4] Patents ⇐165(1)
291k165(1) Most Cited Cases

[4] Patents ⇐167(1)
291k167(1) Most Cited Cases

[4] Patents ⇐168(2.1)
291k168(2.1) Most Cited Cases

Intrinsic evidence, and, in some cases, extrinsic evidence, can shed light on the meaning of the terms recited in a patent claim, either by confirming the ordinary meaning of the claim terms or by providing special meaning for claim terms, but the resulting claim interpretation must, in the end, accord with the words chosen by the patentee to stake out the boundary of the claimed property.

[5] Patents ⇐99
291k99 Most Cited Cases

A party wishing to use statements in the written description to confine or otherwise affect a patent's scope must, at the very least, point to a term or terms in the claim with which to draw in those statements; without any claim term that is susceptible of clarification by the written description, there is no legitimate way to narrow the property right.

[6] Patents ⇐99
291k99 Most Cited Cases

If court need not rely on a limitation imposed by written description to interpret what the patentee meant by a particular term or phrase in a claim, that

limitation is extraneous and cannot constrain the claim.

[7] Patents ⚿99
291k99 Most Cited Cases

[7] Patents ⚿162
291k162 Most Cited Cases

Where patent applicant has elected to be a lexicographer by providing an explicit definition in the specification for a claim term, the definition selected by the patent applicant controls, although the patentee's lexicography must appear with reasonable clarity, deliberateness, and precision before it can affect the claim.

[8] Patents ⚿98
291k98 Most Cited Cases

If patentee provides clear definition of term used in claims, reference to the written description is required, because only there is the claim term defined as it is used by the patentee.

[9] Patents ⚿168(2.1)
291k168(2.1) Most Cited Cases

Any interpretation of patent claim term that is provided or disavowed in the prosecution history shapes the claim scope.

[10] Patents ⚿165(3)
291k165(3) Most Cited Cases

Absent a special and particular definition created by the patent applicant, terms in a claim are to be given their ordinary and accustomed meaning.

[11] Patents ⚿165(3)
291k165(3) Most Cited Cases

When a patent claim term is expressed in general descriptive words, Court of Appeals will not ordinarily limit the term to a numerical range that may appear in the written description or in other claims, nor may Court, in the broader situation, add a narrowing modifier before an otherwise general term that stands unmodified in a claim.

[12] Patents ⚿165(3)
291k165(3) Most Cited Cases

A common meaning for a patent claim term, such as one expressed in a relevant dictionary, that flies in the face of the patent disclosure is undeserving of fealty.

[13] Patents ⚿165(4)
291k165(4) Most Cited Cases

In claim limitation of patent for touch probe requiring that probe generate trigger signal when sensing tip contacted an object and stylus holder was thereby deflected relative to housing, term "when" meant as soon as contact was made and deflection occurred, not at some appreciable time thereafter, and claim thus covered probes which signalled within nonappreciable period of time after contact, such that delay in signaling was insignificant when compared to sensitivity and accuracy of the probe.

[14] Patents ⚿235(2)
291k235(2) Most Cited Cases

Patent claiming touch probe requiring that trigger signal be generated as soon as sensing tip contacted object and deflection occurred was not literally infringed by accused probe which signalled after an appreciable amount of movement of the stylus, which was well after contact with object and initial deflection.

Patents ⚿328(2)
291k328(2) Most Cited Cases

Not infringed.
***1244** Edward P. Walker, Oliff & Berridge, PLC, of Alexandria, Virginia, argued for plaintiff-appellant. With him on the brief was James A. Oliff. Of counsel on the brief were James A. Samborn and Mark K. Riashi, Dickinson, Wright, Moon, Van Dusen & Freeman, of Detroit, Michigan.

Jeffrey M. Johnson, Dickstein, Shapiro, Morin & Oshinsky LLP, of Washington, DC, argued for defendants-appellees. With him on the brief were Charles W. Saber, James W. Brady, Jr., and Laurence E. Fisher. Of counsel was Eric Oliver.

Before PLAGER, CLEVENGER, and GAJARSA, Circuit Judges.

*1245 CLEVENGER, Circuit Judge.

This appeal requires us to determine whether the district court made errors of claim construction that resulted in an erroneous finding of noninfringement at the close of a bench trial. *See Renishaw PLC v. Marposs Societa' Per Azioni,* 974 F.Supp. 1056 (E.D.Mich.1997). At trial, Renishaw plc (Renishaw) asserted that four claims from three patents were infringed by the Mida product line of touch probes produced by Marposs Societa' per Azioni and Marposs Corporation (collectively Marposs). Renishaw appeals only the finding of noninfringement of claim 2 of its U.S. Patent No. 5,491,904 (the '904 patent). Because we conclude that the district court properly found one limitation of the claim not satisfied, we affirm.

I

The '904 patent, listing David McMurtry as its inventor, describes and claims an improved touch probe. Touch probes are used in the automated manufacturing and measurement field to check with extreme precision the dimensions of machined parts. A touch probe consists of a long, thin stylus that extends out from a housing and that can deflect in all directions. The probe, which is mounted on a movable arm of a machine, produces an electrical "trigger" signal when the stylus contacts a workpiece to be measured. A computer that controls the movement of the arm uses the trigger signal to calculate the dimensions or location of the workpiece. Although the stylus can be several inches long, a touch probe often exhibits accuracy on the order of one micron (one millionth of a meter) or less. This relatively small dimension must be kept in mind when discussing the attributes of touch probes. Figures 1 and 2 of the '904 patent show one embodiment of the patented touch probe in vertical and horizontal cross-section, respectively:

Fig. 1.

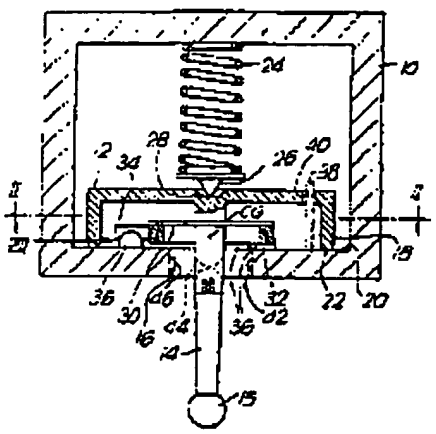
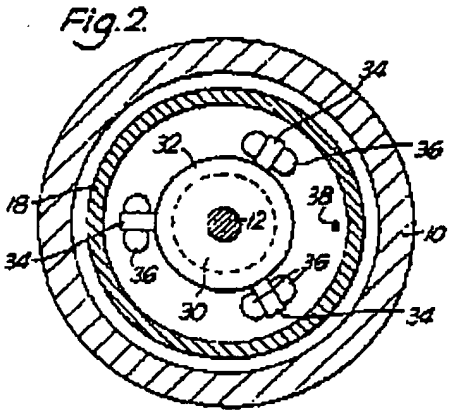


Fig. 2.



In these figures, an inverted cup, or stylus holder **12** , carries a stylus **14** with a sensing tip **15** at its distal end. The stylus holder is located inside a housing **10** and has an annular skirt **18** that rests against a flat interior surface **20** of the housing. The annular skirt is pushed into tight contact with the housing by a biasing spring **24**. When the sensing tip hits an object, the stylus deflects and the stylus holder tilts inside the housing, rotating about a point on the annular skirt where the skirt contacts the housing. A light emitting diode **42** normally shines through an aperture **44** in the stylus to a pair of light detectors **46**. However, when the stylus deflects because of contact with an object, the aperture moves and the light beam is deflected. The light detectors sense the change and then send a signal to the computer that runs the machine. When the stylus moves back away from the object, the biasing spring pushes the stylus holder back down into full contact with the housing, and the light beam returns to the undeflected state.

***1246** With only the structure described above, the stylus holder is likely to slide around some in the housing so that the probe cannot deliver consistent performance. As a solution to this problem, the figures show the stylus poking through, and connected to, a planar spring **30** which is simply a sheet of flexible material and which is attached at its outer edge to a ring **32**. The ring serves as the connecting base for three cylinders **34** which in turn are seated between pairs of balls **36** fixed to the housing. This planar spring assembly, also known as a kinematic mount, can be analogized to a flag pole (*i.e.*, the stylus) stuck through a hole in the surface of a three-legged trampoline. The planar spring prevents the stylus holder from rotating (*i.e.*, about the Z axis) and keeps it from sliding back and forth inside the housing (*i.e.*, in the X and Y axes). When the stylus begins to deflect, the planar spring flexes slightly so that the kinematic mount can remain tightly engaged. With greater deflection, the cylinder on the side opposite the deflection eventually lifts out of its seat, much like a leg on the analogous trampoline would lift off the ground if the flag pole sticking through the flexible surface of the trampoline leaned over too far.

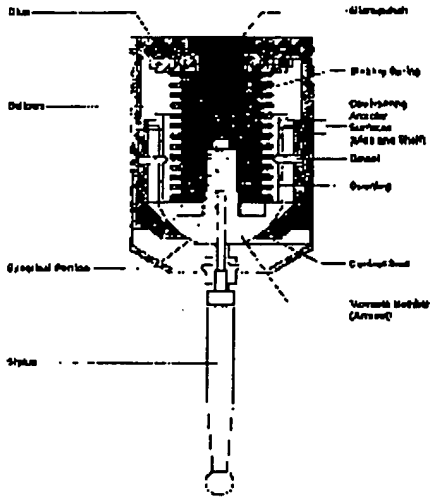
The embodiment just described purportedly solves two problems in the prior art: lobing and hysteresis. Lobing occurs when, because of the way the stylus holder is mounted in the housing, a greater amount of stylus deflection is required to trigger the probe in some directions than in others. The pictured embodiment reduces lobing because the annular skirt results in equal deflection in every direction. Because the probe triggers upon relatively equal deflection in any direction, it can achieve micron-level accuracy by signaling soon after the stylus contacts a workpiece.

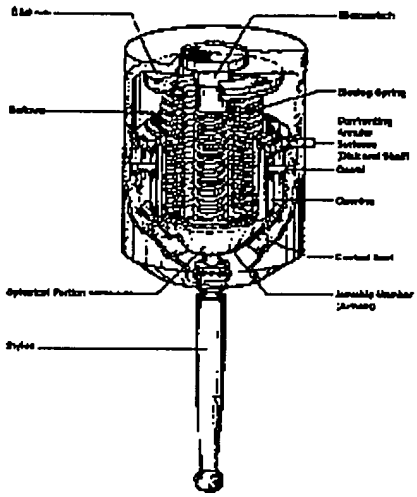
Hysteresis occurs when the stylus returns to a different position after each deflection (*i.e.*, the stylus does not center fully); it is caused primarily by friction between the probe components. The pictured embodiment reduces hysteresis because the

biasing spring pushes the cylinders tightly into their seats between the balls, returning the stylus to the same rest position each time. The key issue on appeal is whether the *claimed* touch probe solves both these problems. Claim 2 recites (emphasis added):

> 2. A touch probe, for use on a movable arm of a position determining apparatus, the probe having a housing with an axis and a stylus holder located within the housing, the stylus holder carrying an elongate stylus which projects through an aperture in the housing, and which has a sensing tip at a free end thereof, *the probe generating a trigger signal when said sensing tip contacts an object and said stylus holder is thereby deflected relative to said housing,* the trigger signal being used by the position determining apparatus to take a reading of an instantaneous position of the movable arm, the touch probe comprising:
> biasing means for applying an axial biasing force to said stylus holder;
> a device acting between said stylus holder and said housing for constraining said stylus holder relative to the housing, the device including a seating and at least one constraining spring distinct from the biasing means, said seating including at least one pair of mutually engageable elements, each mutually engageable element having a surface inclined relative to the axis of the housing and providing lateral constraint from axial biasing;
> an annular member retained in a predetermined relationship with the stylus holder and having an annular surface facing in a direction of said aperture, said annular member being tiltable relative to the housing, and said stylus holder being tiltable with said annular member relative to said housing about a point on said annular surface; and
> a transducer for generating said trigger signal, said transducer being actuable by tilting of said stylus holder with said annular member about said point on said annular surface, wherein said tilting of said stylus holder relative to the housing is accommodated by flexing of said at least one constraining spring and said mutually engageable elements coming out of contact with each other.

***1247** Renishaw asserts infringement of claim 2 by Versions 4 and 5 from Marposs's Mida line of touch probes. The Version 5 probe is illustrated in vertical and oblique cross-section in plaintiff's exhibits below:





In the Mida probes, the stylus holder ("armset" in the diagram) has a spherical surface that rests in a conical seat in the housing and a central extension that rises toward a microswitch. The stylus holder also has an annular member ("disk" in the diagram), but unlike the annular skirt in the preferred embodiment of the '904 patent, it does not normally rest flat against the housing. Rather, it rests above a shelf built into the side of the housing and is separated from the shelf by a small gap. Thus, when the stylus contacts an object, the stylus holder does not immediately move upward toward the microswitch. Instead, it first rotates inside the conical seat (like a ball-and-socket joint). Once the annular disk hits the shelf, the stylus holder tips upward and its central extension hits the microswitch. [FN1]

> FN1. The Version 4 probes and the Version 5 probes differ only in the location of the biasing spring. On the Version 5 probes (pictured), the spring runs from the edge of the microswitch to the central extension of the stylus holder. On the Version 4 probes (not pictured), the spring's diameter is larger and the spring runs from the probe housing to the top of the annular ring.

The annular ring cannot rest in flat contact with the shelf, and therefore, the spring can only force the stylus to return to a "neutral zone" rather than to a single precise rest position. As a result, the Mida probes are not designed to signal as soon as the stylus begins to move. Instead, they do not signal until the probe reaches the edge of the neutral zone. Because the size of the neutral zone is known, the location of the object being measured can be calculated. Thus, although the Mida probes do not eliminate hysteresis, they nonetheless provide precise readings.

Renishaw sued Marposs in July 1994, and a bench trial on infringement was held in March 1997. During the trial, Marposs presented no evidence regarding invalidity. At the close of the evidence, the district court took the case under advisement and requested proposed findings and post-trial briefs from both sides. In August 1997, the court found that none of Marposs's accused touch trigger probes infringed any of the asserted patent claims. Renishaw appeals the finding of noninfringement only with respect to claim 2 of the '904 patent. We have jurisdiction under 28 U.S.C. § 1295(a)(1) (1994).

II

[1][2] An infringement analysis is a two-step process in which we first determine the correct claim scope, and then compare the properly construed claim to the accused device to determine

whether all of the claim ***1248** limitations are present either literally or by a substantial equivalent. *See General Mills, Inc. v. Hunt-Wesson, Inc.,* 103 F.3d 978, 981, 41 USPQ2d 1440, 1442 (Fed.Cir.1997). We review the first step without deference to the trial court, *see Cybor Corp. v. FAS Techs., Inc.,* 138 F.3d 1448, 1455, 46 USPQ2d 1169, 1173 (Fed.Cir.1998) (in banc), and the second step for clear error when infringement is tried to the bench, *see Young Dental Mfg. Co. v. Q3 Special Prods., Inc.,* 112 F.3d 1137, 1141, 42 USPQ2d 1589, 1592 (Fed.Cir.1997).

On appeal, Renishaw asserts that the district court erred in construing three separate limitations in claim 2 and that those errors resulted in the court's erroneous finding of noninfringement. We address the claim requirement that the "probe generat[e] a trigger signal when said sensing tip contacts an object." Renishaw contends that the district court improperly read a limitation into this claim limitation from the '904 patent's written description.

Renishaw, of course, alludes to a familiar pair of claim construction canons: (a) one may not read a limitation into a claim from the written description, but (b) one may look to the written description to define a term already in a claim limitation, for a claim must be read in view of the specification of which it is a part. These two rules lay out the general relationship between the claims and the written description. *See Vitronics Corp. v. Conceptronic, Inc.,* 90 F.3d 1576, 1582, 39 USPQ2d 1573, 1576 (Fed.Cir.1996); *Markman v. Westview Instruments, Inc.,* 52 F.3d 967, 979-80, 34 USPQ2d 1321, 1329-30 (Fed.Cir.1995) (in banc), *aff'd,* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577, 38 USPQ2d 1461 (1996). As rules at the core of claim construction methodology, they provide guideposts for a spectrum of claim construction problems.

[3][4] Although no canon of construction is absolute in its application, [FN2] these two rules share two underlying propositions. First, it is manifest that a claim must explicitly recite a term in need of definition before a definition may enter the claim from the written description. This is so because the claims define the scope of the right to exclude; the claim construction inquiry, therefore, begins and ends in all cases with the actual words of the claim, *see Abtox, Inc. v. Exitron Corp.,* 122 F.3d 1019, 1023, 43 USPQ2d 1545, 1548 (Fed.Cir.1997) ("[T]he language of the claim frames and ultimately resolves all issues of claim interpretation."); *Bell Communications Research, Inc. v. Vitalink Communications Corp.,* 55 F.3d 615, 619-20, 34 USPQ2d 1816, 1819 (Fed.Cir.1995). The intrinsic evidence, and, in some cases, the extrinsic evidence, can shed light on the meaning of the terms recited in a claim, either by confirming the ordinary meaning of the claim terms or by providing special meaning for claim terms. *See Vitronics,* 90 F.3d at 1583, 39 USPQ2d at 1577. However, the resulting claim interpretation must, in the end, accord with the words chosen by the patentee to stake out the boundary of the claimed property. *See Thermalloy, Inc. v. Aavid Eng'g, Inc.,* 121 F.3d 691, 693, 43 USPQ2d 1846, 1848 (Fed.Cir.1997) ("[T]hroughout the interpretation process, the focus remains on the meaning of claim language.").

> FN2. *See Modine Mfg. Co. v. United States Int'l Trade Comm'n,* 75 F.3d 1545, 1551, 37 USPQ2d 1609, 1612 (Fed.Cir.1996) ("All rules of construction must be understood in terms of the factual situations that produced them, and applied in fidelity to their origins."); *Autogiro Co. of Am. v. United States,* 181 Ct.Cl. 55, 384 F.2d 391, 397, 155 USPQ 697, 702 (Ct.Cl.1967) ("In utilizing all the patent documents, one should not sacrifice the value of these references by the unimaginative adherence to well-worn professional phrases." (internal quotation marks omitted)); *cf.* Karl N. Llewellyn, *Remarks on the Theory of Appellate Decision and the Rules or Canons About How Statutes Are to be Construed,* 3 Vand.L.Rev. 395, 401-06 (1950) (listing thrusts and parries of canons of construction of statutory provisions to illustrate their tractability).

[5][6] Thus, a party wishing to use statements in the written description to confine or otherwise affect a patent's scope must, at the very least, point to a term or terms in the claim with which to draw in those statements. Without any claim term that is susceptible of clarification by the written

description, there is no legitimate way to narrow the property right. The Supreme Court has clearly stated the rationale for this requirement:

> ***1249** [W]e know of no principle of law which would authorize us to read into a claim an element which is not present, for the purpose of making out a case of novelty or infringement. The difficulty is that if we once begin to include elements not mentioned in the claim in order to limit such claim ..., we should never know where to stop.

McCarty v. Lehigh Val R.R., 160 U.S. 110, 116, 16 S.Ct. 240, 40 L.Ed. 358 (1895). If we need not rely on a limitation to interpret what the patentee meant by a particular term or phrase in a claim, that limitation is "extraneous" and cannot constrain the claim. *See Hoganas AB v. Dresser Indus., Inc.*, 9 F.3d 948, 950, 28 USPQ2d 1936, 1938 (Fed.Cir.1993) ("It is improper for a court to add 'extraneous' limitations to a claim, that is, limitations added wholly apart from any need to interpret what the patentee meant by particular words or phrases in the claim.") (quoting *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433, 7 USPQ2d 1129, 1131 (Fed.Cir.1988)); *see also Specialty Composites v. Cabot Corp.*, 845 F.2d 981, 987, 6 USPQ2d 1601, 1605 (Fed.Cir.1988) ("Where a specification does not *require* a limitation, that limitation should not be read from the specification into the claims.") (citing *Lemelson v. United States*, 752 F.2d 1538, 1551-52, 224 USPQ 526, 534 (Fed.Cir.1985)); *cf. Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571, 7 USPQ2d 1057, 1065 (Fed.Cir.1988) (holding that the written description provided "no evidence to indicate that [ ] limitations must be imported into the claims to give meaning to disputed terms").

[7][8][9] The other clear point provided by these two canons covers the situation in which a patent applicant has elected to be a lexicographer by providing an explicit definition in the specification for a claim term. In such a case, the definition selected by the patent applicant controls. The patentee's lexicography must, of course, appear "with reasonable clarity, deliberateness, and precision" before it can affect the claim. *In re Paulsen*, 30 F.3d 1475, 1480, 31 USPQ2d 1671, 1674 (Fed.Cir.1994); *see Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1388, 21 USPQ2d 1383, 1386 (Fed.Cir.1992). If the patentee provides such a clear definition, the two canons require reference to the written description, because only there is the claim term defined as it is used by the patentee. [FN3] The law provides a patentee with this opportunity because the public may not be schooled in the terminology of the technical art or there may not be an extant term of singular meaning for the structure or concept that is being claimed. *See Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 889, 221 USPQ 1025, 1031 (Fed.Cir.1984).

> FN3. Likewise, any interpretation that is provided or disavowed in the prosecution history also shapes the claim scope. *See Loctite Corp. v. Ultraseal, Ltd.*, 781 F.2d 861, 867, 228 USPQ 90, 93-94 (Fed.Cir.1985) (holding that although term was not limited by the specification, it was "expressly defined" in a narrow manner in the prosecution history); *see also CVI/Beta Ventures, Inc. v. Tura LP*, 112 F.3d 1146, 1158-59, 42 USPQ2d 1577, 1585-86 (Fed.Cir.1997) (reviewing statements in the prosecution history in determining that claim term "elasticity" required total, not just partial, recovery from deformation); *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 452, 227 USPQ 293, 296 (Fed.Cir.1985).

[10][11] Absent a special and particular definition created by the patent applicant, terms in a claim are to be given their ordinary and accustomed meaning. *See York Prods., Inc. v. Central Tractor Farm & Family Ctr.*, 99 F.3d 1568, 1572, 40 USPQ2d 1619, 1622 (Fed.Cir.1996) ("Without an express intent to impart a novel meaning to claim terms, an inventor's claim terms take on their ordinary meaning."); *Carroll Touch, Inc. v. Electro Mechanical Sys., Inc.*, 15 F.3d 1573, 1577, 27 USPQ2d 1836, 1840 (Fed.Cir.1993). Thus, when a claim term is expressed in general descriptive words, we will not ordinarily limit the term to a numerical range that may appear in the written description or in other claims. *See Modine Mfg.*, 75 F.3d at 1551, 37 USPQ2d at 1612. Nor may we, in the broader situation, add a narrowing modifier before an otherwise general term that stands unmodified in a claim. *See, e.g., Bell Communications*, 55 F.3d at

621-22, 34 USPQ2d at 1821 (faulting the district court for interpreting claim term "associating" to cover only explicit, and not implicit, association); ***1250***Specialty Composites,* 845 F.2d at 986-87, 6 USPQ2d at 1604 (refusing to limit the recited claim term "plasticizer" to external plasticizers where skilled artisans used the term broadly). For example, if an apparatus claim recites a general structure (*e.g.,* a noun) without limiting that structure to a specific subset of structures (*e.g.,* with an adjective), we will generally construe the claim to cover all known types of that structure that are supported by the patent disclosure. *See, e.g., Virginia Panel Corp. v. MAC Panel Co.,* 133 F.3d 860, 865-66, 45 USPQ2d 1225, 1229 (Fed.Cir.1997) (claim term "reciprocating" is given its ordinary meaning and not limited to mere linear reciprocation); *Sjolund v. Musland,* 847 F.2d 1573, 1581-82, 6 USPQ2d 2020, 2027 (Fed.Cir.1988) (refusing to limit claim term "baffle" to only rigid baffles and term "panel" to only panels of lattice construction).

[12] However, a common meaning, such as one expressed in a relevant dictionary, that flies in the face of the patent disclosure is undeserving of fealty. As one of our predecessor courts stated in *Liebscher v. Boothroyd,* 46 C.C.P.A. 701, 258 F.2d 948 (CCPA 1958):

> Indiscriminate reliance on definitions found in dictionaries can often produce absurd results.... One need not arbitrarily pick and choose from the various accepted definitions of a word to decide which meaning was intended as the word is used in a given claim. The subject matter, the context, etc., will more often than not lead to the correct conclusion.

Id. at 951; *see Digital Biometrics, Inc. v. Identix, Inc.,* 149 F.3d 1335, 1346-47, 47 USPQ2d 1418, 1426 (Fed.Cir.1998); *see also Intel Corp. v. United States Int'l Trade Comm'n,* 946 F.2d 821, 836, 20 USPQ2d 1161, 1174 (Fed.Cir.1991) (affirming construction of "permanent" as a relative term in light of the patent disclosure); *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.,* 776 F.2d 281, 298, 227 USPQ 657, 668 (Fed.Cir.1985) (claim limitation requiring that a process be carried out "under substantially anhydrous conditions with the removal of water above 100° C" covered only *continuous* removal of water, because the written description stated that failure to remove water continously would adversely affect the process). Thus, where there are several common meanings for a claim term, the patent disclosure serves to point away from the improper meanings and toward the proper meaning.

Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim. *See Markman v. Westview Instruments, Inc.,* 517 U.S. 370, 389, 116 S.Ct. 1384, 134 L.Ed.2d 577, 38 USPQ2d 1461, 1470 (1996). The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction. *See Young Dental,* 112 F.3d at 1142, 42 USPQ2d at 1593 (affirming the district court's claim construction as "a more natural reading of the claim language" than the appellant's construction); *cf.* Llewellyn, *supra* note 2, at 401 ("Plainly, to make any canon take hold in a particular instance, the construction contended for must be sold, essentially, by means other than the use of the canon: The good sense of the situation and a *simple* construction of the available language to achieve that sense, *by tenable means, out of the statutory language.*"). A claim construction is persuasive, not because it follows a certain rule, but because it defines terms in the context of the whole patent.

Following these principles, we turn to the parties' arguments.

III

[13] The main dispute concerns the requirement that "the probe generat[e] a trigger signal when said sensing tip contacts an object and said stylus holder is thereby deflected relative to said housing." The district court determined that "when" is defined by reference to this entire claim limitation, such that "when" means as soon as contact is made and deflection occurs. *See Renishaw,* 974 F.Supp. at 1089. On appeal, Renishaw argues that "when" should receive one of its broader dictionary definitions: "at or after the time that," "in the event that," or "on condition that," so that the claim would read on a device that does not generate a trigger ***1251** signal until an appreciable amount of time after contact is made and deflection begins. Because infringement of this limitation depends on the meaning of the word "when," we refer to it in the

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remainder of the opinion as the "when" limitation. We agree with the district court's construction of this claim limitation and, because all limitations must be met for there to be infringement, we need consider only this limitation.

The ultimate issue is the manner in which "when" defines the timing of probe triggering vis-à-vis contact of a stylus with a workpiece. The issue brings into sharp focus the convergence of the two canons of claim construction discussed above. According to Renishaw, the accused probes escape infringement only if a narrowing limitation is read into "when" from the written description. Marposs counters with an argument that the claim is properly construed to require a finding of noninfringement because the correct meaning of the claim term "when" is embedded throughout the specification.

Neither party forwards a technical meaning for "when" in the applicable industry. However, there are several closely-related, but distinct, common meanings for "when," most cited by Renishaw on appeal. These include: at or during the time that; just at the moment that; at any or every time that; at, during, or after the time that. [FN4] Renishaw asserts that nothing in claim 2 places an outer endpoint on the time at which a trigger signal must be generated, other than that the device be capable of generating some trigger signal. Therefore, contends Renishaw, the trial court's definition of the term was overly narrow, and the claim is properly defined simply as "at or after the time that." For its part, Marposs argues that the '904 patent's written description exhibits a clear intent to provide triggering as soon as possible after contact with a workpiece, not at appreciable times after contact. Marposs argues that in claim 2 the use of "when" provides an entry point into the claim for that intent.

> FN4. These definitions are taken from *Webster's Ninth New Collegiate Dictionary* 1342 (1985); *Webster's Third New International Dictionary* 2602 (1993); and the *Chambers Concise Dictionary* 1223 (1992).

The explicit language of claim 2 is our starting point. There, the claim states that a signal is generated "when" there is contact with a workpiece "and said stylus holder is thereby deflected." The claim ties the signal to contact and deflection, thus showing that the trigger signal cannot occur until the probe has contacted the workpiece *and* the stylus has deflected some amount. In other words, contact and deflection are a condition precedent to signaling. Thus, the claim itself precludes us from viewing "when" as requiring signaling at the precise moment of contact, for some deflection must occur before signaling. The district court also recognized this. *See Renishaw,* 974 F.Supp. at 1071; *see also Mantech Envtl. Corp. v. Hudson Envtl. Servs., Inc.,* 152 F.3d 1368, 1373-74 (Fed.Cir.1998) (looking to other terms in a claim to construe a limitation in dispute); *Phonometrics, Inc. v. Northern Telecom Inc.,* 133 F.3d 1459, 1465, 45 USPQ2d 1421, 1426 (Fed.Cir.1998) (same).

Mere recognition that "when" is not limited to the precise moment of contact, however, does not make the term clear, or mandate a meaning of "when" to include any time after contact as long as a measurement is derived from stylus contact. That is because "when" is not a broad and general term when standing in isolation. Instead, it has several meanings, each of which may prevail based on the context. Here, we have bounteous context. Claim 2 does not exist in rarefied air, but rather is surrounded by a patent disclosure of singular purpose. As evidenced by the several common meanings of "when," the term is imprecise as used in the '904 patent. The term is not ambiguous, however, because the written description provides overwhelming evidence to guide a proper interpretation of the term. *See Vitronics,* 90 F.3d at 1583, 39 USPQ2d at 1577. Replete with references that indicate that the patentee was preeminently concerned with generating a trigger signal as soon as possible after contact, the written description lends precision to the term "when." The written description shows that the patentee's invention is directed at a machine that produces ***1252** very accurate, very precise probe readings by maintaining tight control over the position of the stylus. In the context of the invention, such readings can only be obtained if the probe triggers very, very soon after contact.

For example, in describing the invention's place within the prior art, the '904 patent notes: "When the stylus contacts a workpiece surface, a trigger signal is generated by the probe, which is used to

trigger the taking of a reading of the instantaneous position of the movable spindle, quill or arm." Col. 1, ll. 36-42. Likewise, the Summary of the Invention states that the preferred embodiment of the probe "includes means for providing a signal when said stylus contacts a workpiece," col. 3, ll. 28-29, and that the movable elements are displaced "out of said rest position when said stylus contacts a workpiece," col. 3, ll. 21-22.

Statements in the "Description of Preferred Embodiments" also use the term "when" to describe a time very close to the precise instant that the stylus contacts the object to be measured and not some appreciable time thereafter:

> When the stylus **14** contacts a workpiece, from any direction, the stylus is deflected. For example, if the contact is in a horizontal direction, the stylus **14** tilts, about a point of contact between the surfaces **20** and **22**. At this time, the cylinders **34** and balls **36** remain engaged with each other, and the tilting is accommodated by flexing of the planar spring **30** ....
>
> ....
>
> When the deflecting force on the stylus 14 ceases (i.e. when the probe is moved so that the stylus 14 no longer contacts the workpiece) the stylus member 12 is returned to its axial and lateral rest position by the action of the spring 24.

Col. 4, l. 52 to col. 5, l. 7. This passage refers to "when" as "at this time," *i.e.*, when the planar spring is flexing and the cylinders, or analogously, the legs of the trampoline, have not yet lifted out of their moorings. In other passages, the written description states: "The *instant at which* the stylus tip **15** *first contacts* a workpiece can be detected in various possible ways," col. 6, ll. 10-11, that the photoelectric sensor is responsive to motion caused "when the stylus **14** *begins* to deflect upon contact with a workpiece," col. 6, ll. 33-34, "when the stylus **14** is deflected by contact with a workpiece, the cage **86** *initially* remains stationary in its kinematic rest position," col. 8, ll. 60-63, "[a]ll of the embodiments of FIGS. 4-10 may have any of the arrangements for detecting the *instant of contact* between the stylus tip and a workpiece," col. 9, ll. 16-20, and:

> In operation, when the stylus **14** is deflected by contact with a workpiece, *at first* the skirt **72** and cage **64** lift or tilt bodily from the surfaces **74**.... Also for the same reason, when eventually the stylus returns to its rest position, there is little or no hysteresis in its rest position.
>
> However, the above bodily lifting or tilting of the cage **64** *upon deflection* of the stylus *only lasts for a very small amount of stylus deflection.*

Col. 8, ll. 11-13 (emphasis added to all quotations). These passages make abundantly clear that "when" in the patent means at the time of, and not some appreciable time thereafter. *See Autogiro Co.*, 384 F.2d at 397, 155 USPQ at 702-03 ("[W]ords must be used in the same way in both the claims and the specification.").

To the extent that these passages refer to the preferred embodiment, they cannot be read into the claims without some hook. The claim term "when" is that hook. Each of the passages above show that the patentee wanted "when" to mean as soon as possible after contact. In contrast, Renishaw's proferred construction of "when," which would sweep in any time whatsoever after contact, is so broad that it would require us to ignore the abounding statements in the written description that point decidedly the other way.

Renishaw might have us save its claim by placing a functional limitation on the claim such that "when" would permit signaling at any time after contact but no longer than would permit accurate measurement of the workpiece. However, this limitation appears nowhere in the claims; rather, it comes from a concept of operability. To the extent Renishaw must refer to the written description, the patentee's extremely detailed account of ***1253** his invention in that written description shows that his aim was to generate a signal as soon as possible after contact, not to generate a signal at appreciable times after contact. Any delay in signaling with Renishaw's probes creates an unrecoverable error, because they must equate the position of the probe at the moment of signaling with the position of the workpiece. Therefore, delay in signaling while the probe continues to move creates an error. The patentee strove to eliminate this error, and the entire patent document exhibits his intent to make the delay between contact and signaling as small as possible.

Our construction of "when" matches that of the district court. Although the district court initially construed "when" to mean "at the time that," it recognized that its choice of words could be read out of context to require immediate signaling, a

physical impossibility. The district court therefore clarified its construction as follows:

> While it is of course true that the laws of nature dictate that no detection device can be "absolutely instantaneous," the claims, specifications, figures, and Mr. McMurtry's testimony confirm that the patented probes signal as soon as possible when the stylus tip contacts the workpiece. The quicker the Renishaw probes trigger, the better their performance. In short, the patents teach the quickest signaling possible, and there is no suggestion otherwise. In fact, Mr. McMurtry stated that he taught good probes with quick signals, "wouldn't do anything but that, but to teach the best."

Renishaw, 974 F.Supp. at 1071. Consistent with this understanding and with the understanding that the claimed probes operate at a micron-level scale, we hold that claim 2 covers probes which signal within a nonappreciable period of time after contact such that the delay in signaling is insignificant when compared to the sensitivity and accuracy of the probe.

IV

[14] The operation of the Marposs Mida probes is not disputed. They signal after an appreciable amount of movement of the stylus which is well after the contact with the workpiece and initial deflection. In fact, this appreciable delay is part of the design of the Mida probes and ensures that they can operate properly without centering fully. The same delay that creates unrecoverable error in the probes disclosed in the '904 patent is necessary to provide accuracy in the Mida probes. The Mida probes can still measure precisely, but they do so by taking advantage of designed-in delay. There is thus no clear error in the court's finding that the Mida probes do not literally infringe the "when" limitation.

Renishaw hints in its submissions on appeal that Marposs's probes at least infringe by equivalents. However, Renishaw's citations to the record indicate only that the issue of *literal* infringement was raised at trial. Thus, there is no need to remand to the district court. We therefore affirm.

AFFIRMED.

158 F.3d 1243, 48 U.S.P.Q.2d 1117

END OF DOCUMENT

952 F.2d 1384
21 U.S.P.Q.2d 1383
(Cite as: 952 F.2d 1384)

▷

United States Court of Appeals,
Federal Circuit.

INTELLICALL, INC., Plaintiff-Appellee,
v.
PHONOMETRICS, INC., Defendant-Appellant.

No. 91-1283.

Jan. 9, 1992.

In patent infringement suit, declaration that patent had not been infringed was entered by the United States District Court for the Northern District of Texas, Sidney A. Fitzwater, J., and patentholder appealed. The Court of Appeals, Nies, Chief Judge, held that: (1) "digital display" within claim did not encompass machine readable as well as human readable "displays," and (2) patent claiming apparatus for automatically computing and recording costs of long-distance telephone calls was not infringed by accused pay telephones, which did not satisfy claim element that device provide instantaneous visual display of cumulative call costs in dollars and cents.

Affirmed.

West Headnotes

[1] Federal Courts ⚿766
170Bk766 Most Cited Cases

In reviewing district court's grant of summary judgment, Court of Appeals is not bound by district court's holding that no material facts are in dispute, but must make an independent determination as to whether the standards for summary judgment have been met. Fed.Rules Civ.Proc.Rule 56(c), 28 U.S.C.A.

[2] Patents ⚿323.2(1)
291k323.2(1) Most Cited Cases

Patent claim interpretation is a question of law amenable to summary judgment, and disagreement over the meaning of a term within claim does not necessarily create a genuine issue of material fact.

[3] Patents ⚿157(2)
291k157(2) Most Cited Cases

Terms in claim are given their ordinary meaning to one of skill in the art unless it appears from the patent and file history that the terms were used differently by the inventors.

[4] Patents ⚿323.2(4)
291k323.2(4) Most Cited Cases

Where disputed term in patent claim would be understood to have its ordinary meaning by one of skill in the art from the patent and its history, extrinsic evidence that inventor may have subjectively intended a different meaning does not preclude summary judgment.

[5] Patents ⚿165(5)
291k165(5) Most Cited Cases

"Digital display" within patent claim for apparatus for automatically computing and recording cost of long-distance telephone calls did not encompass machine readable as well as human readable "displays," and use of term "readout means" in another claim did not preclude "digital display means" from being visual under the doctrine of claim differentiation.

[6] Patents ⚿165(3)
291k165(3) Most Cited Cases

Inventor may be his own lexicographer, but where inventor chooses to give terms uncommon meanings, he must set out his uncommon definition in some manner within the patent disclosure.

[7] Patents ⚿226.7
291k226.7 Most Cited Cases

To satisfy means-plus-function limitation literally, so as to establish infringement, accused device must perform the identical function required by the limitation and must incorporate the structure disclosed in the specification, or its substantial structural equivalent, as the means for performing that function. 35 U.S.C.A. § 112.

[8] Patents ⚿235(2)
291k235(2) Most Cited Cases

[8] Patents ⚿237
291k237 Most Cited Cases

Patent for apparatus for automatically computing and recording the cost of long-distance telephone calls, and providing for "digital display," was not infringed, literally or under doctrine of equivalents, by pay telephones which did not provide any digital display or which displayed decrementing time information rather than cumulative call cost in dollars and cents as literally required by the claim. 35 U.S.C.A. § 112.

[9] Patents ⚿237
291k237 Most Cited Cases

It is not sufficient to establish infringement under doctrine of equivalents that accused devices are equivalent overall to claimed invention; infringement requires that every limitation of a claim must be met literally or by a substantial equivalent.

[10] Patents ⚿323.2(4)
291k323.2(4) Most Cited Cases

Plaintiff in patent infringement suit had duty, on motion for summary judgment, to submit evidence with respect to infringement under doctrine of equivalents, even though it was the nonmovant, in that movant could prevail by pointing out absence of evidence to support nonmoving party's case with respect to issue on which nonmovant bore he burden. Fed.Rules Civ.Proc.Rule 56(c), 28 U.S.C.A .

Patents ⚿328(2)
291k328(2) Most Cited Cases

3,769,463. Not infringed.
***1385** Robert M. Chiaviello, Jr., Baker & Botts, Dallas, Tex., argued, for plaintiff-appellee. With him on the brief were Kevin J. Meeks and Jerry W. Mills. Also on the brief were Thomas H. Adolph, Alan D. Rosenthal and Michael E. Wilson, of Baker & Botts, Houston, Tex.

W. Bryan Farney, Arnold, White & Durkee, Houston, Tex., argued, for defendant-appellant.

Before NIES, Chief Judge, MARSHALL, Associate Justice (Retired), Supreme Court of the United States, sitting by designation, and FRIEDMAN, Senior Circuit Judge.

NIES, Chief Judge.

Phonometrics, Inc., owner of U.S. Patent No. 3,769,463 (the '463 patent), appeals from the summary judgment of the United States District Court for the Northern District of Texas declaring that Intellicall, Inc., had not infringed the '463 patent. We affirm.

I.
BACKGROUND

The '463 patent claims an apparatus for automatically computing and recording the cost of a long-distance telephone call. As described in the specification, the cumulative call cost information is displayed to the caller while the call is being made. Claim ***1386** 1, the only independent claim of the '463 patent, defines the invention as follows:

> 1. An electronic solid state long-distance telephone call cost computer apparatus for computing and recording the cost of each long-distance telephone call initiated from a given calling telephone, actuated by the lifting and replacement of the calling telephone to operate switch means coupled to the calling telephone, and further actuated by a call-completion signal generated in the telephone system when a called party answers at a called telephone, the computer apparatus comprising:
> call timing means for timing the duration of each completed call;
> settable charge selector means for storing initial fixed charge data for a given predetermined initial call interval and incremental charge data for subsequent additional predetermined incremental call intervals;
> call cost register means, including a digital display for providing a substantially instantaneous display of cumulative call cost in dollars and cents;
> and computer circuit means, coupled to said switch, to said timing means, to said charge selector means, and to said call cost register means, for automatically recording, in the call cost register means, the cost of each long-distance

call made from the calling telephone, said computer circuit means comprising:
reset means for resetting said timing means and said call cost register means immediately upon occurrence of said call completion signal;
initial cost transfer means initiating operation of said call timing means and for applying the complete initial fixed charge data from said charge selector means to said call cost register means substantially instantaneously upon resetting of said call timing means and said call cost register;
incremental cost transfer means for applying the complete incremental charge data from said charge selector means to said call cost register means substantially instantaneously upon completion of timing out the initial call interval by said call timing means and for again applying the complete incremental charge data from said charge selector means to said call cost register means substantially instantaneously upon completion of timing out of each incremental call interval following said initial call interval;
and termination means for interrupting operation of said computer apparatus, with the cumulative call cost held in and displayed by said call cost register means, upon operation of said switch by replacement of the calling telephone.

Phonometrics does not manufacture any products nor has it granted any licenses under the '463 patent.

Intellicall brought this declaratory judgment action against Phonometrics in the Texas district court. Phonometrics counterclaimed for infringement and both parties filed motions for summary judgment on the sole issue of infringement.

Intellicall's accused devices are several types of pay telephones. Intellicall's "window phones" visually display to the caller the amount of money deposited and count down the time remaining for the deposited amount. In some instances Intellicall phones provide digitalized voice messages in addition to, or in place of, the visual display. Intellicall also sells software which accumulates and stores call information. It is not clear exactly what functions this "Intellistar" software performs. However, access to this stored information requires opening the telephone or interrogating the Intellistar memory via computer.

The present appeal centers around the functions required for the "call cost register means" of the claim. The district court held that this means must provide an instantaneous visual display of cumulative ***1387** call cost in dollars and cents and that none of the accused Intellicall devices satisfies this element of the claim literally or under the doctrine of equivalents. Accordingly, the district court granted Intellicall's motion for summary judgment on non-infringement. This appeal followed.

II.
STANDARD OF REVIEW

[1] A motion for summary judgment is properly granted only "if the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law." Fed.R.Civ.P. 56(c). *A.B. Chance Co. v. RTE Corp.*, 854 F.2d 1307, 1310, 7 USPQ2d 1881, 1883-84 (Fed.Cir.1988). In reviewing the district court's grant of summary judgment, we are not bound by its holding that no material facts are in dispute. Rather, we must make an independent determination as to whether the standards for summary judgment have been met. *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1560, 19 USPQ2d 1111, 1114 (Fed.Cir.1991). Therefore, we must determine whether the district court improperly resolved any genuine issues of material fact and whether Intellicall is entitled to judgment as a matter of law.

III.
CLAIM INTERPRETATION

[2][3][4] Claim interpretation is a question of law amenable to summary judgment, *Johnston v. IVAC Corp.*, 885 F.2d 1574, 1579-80, 12 USPQ2d 1382, 1385-86 (Fed.Cir.1989), and disagreement over the meaning of a term within a claim does not necessarily create a *genuine* issue of material fact. *Becton Dickinson & Co. v. C.R. Bard, Inc.*, 922 F.2d 792, 797, 17 USPQ2d 1097, 1100 (Fed.Cir.1990). The terms in a claim are given their ordinary meaning to one of skill in the art unless it appears from the patent and file history that the terms were used differently by the inventors. *Envirotech Corp. v. Al George, Inc.*, 730 F.2d 753, 759, 221 USPQ 473, 477 (Fed.Cir.1984).

Thus, where a disputed term would be understood to have its ordinary meaning by one of skill in the art from the patent and its history, extrinsic evidence that the inventor may have subjectively intended a different meaning does not preclude summary judgment. In such instance, there is no *genuine* dispute respecting a material fact.

[5] The district court found that the accused devices did not meet the limitation of claim 1 which reads:

> call cost register means, including a *digital display* for providing a substantially *instantaneous display* of cumulative call cost in dollars and cents. [Emphasis added.]

Phonometrics contends "digital display" encompasses machine readable as well as human readable "displays" and further contends "instantaneous display" requires only that a "digital display" be instantaneously provided to the memory of a machine. To support this interpretation Phonometrics points to the testimony of the inventors and their attorney, the language used in other patents, and the principle of claim differentiation.

The district court held this evidence did not create a genuine issue respecting claim interpretation, relying on the expert testimony of Intellicall's witness that to one of skill in the art the language describes a device that visually conveys the cost of a call to a human being as the information is being collected. The specification fully supports the district court's interpretation both in function and in structure. Conversely, the patent does not support Phonometrics' interpretation, an interpretation which Phonometrics concedes does not give the terms their ordinary meaning.

[6] Phonometrics first argues that an inventor may be his own lexicographer. ***1388** While true as an abstract proposition, that truism has no application in the present case. Where an inventor chooses to be his own lexicographer and to give terms uncommon meanings, he must set out his uncommon definition in some manner within the patent disclosure. *See Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 889, 221 USPQ 1025, 1031 (Fed.Cir.1984). In *Lear* we stated that:

> So long as the meaning of an expression is made reasonably clear and its use is consistent within a patent disclosure, an inventor is permitted to define the terms of his claims. Nevertheless, the place to do so is in the specification of the inventor's application, and the time to do so is prior to that application acquiring its own independent life as a technical disclosure through its issuance as a United States patent. The litigation-induced pronouncements of [the inventor], coming nearly at the end of the term of his patent, have no effect on what the words of that document in fact do convey and have conveyed during its term to the public.

Id. (citation omitted); *Jurgens v. McKasy*, 927 F.2d 1552, 1561, 18 USPQ2d 1031, 1038 (Fed.Cir.) , *cert. denied*, 502 U.S. 902, 112 S.Ct. 281, 116 L.Ed.2d 232 (1991) ("neither the specification nor the prosecution history indicate that [the inventor] intended another meaning"); *see also Jonsson v. Stanley Works*, 903 F.2d 812, 820, 14 USPQ2d 1863, 1871 (Fed.Cir.1990) ("[w]ords in a claim ... given their ordinary and accustomed meaning" (citing, *inter alia, Chicago Steel Foundry Co. v. Burnside Steel Foundry Co.*, 132 F.2d 812, 814-15, 56 USPQ 283, 286 (7th Cir.1943))). The inventors here assert at most a secretly held intended meaning.

The district court properly focused on the evidence of what the words, as used in the context of the patent, would mean to one of skill in the art and found no support for a construction of "digital display" which would encompass either machine readable or human readable devices, nor for a construction that an "instantaneous [digital] display" includes information given to a computer for later access. [FN1] We agree.

> FN1. In some instances, the district court stated that the display was "to the caller." Appellant asserts that the court thereby added a limitation to the claim. If this was an error, and we are not persuaded that the court intended to so restrict the claim when the restriction was not necessary to its discussion, the error would be harmless. The claim does not, in any event, encompass machine readable information.

Phonometrics' evidence does not raise a genuine issue of material fact: (1) the testimony of the inventors and their attorney as to their intended usage does not negate the meaning conveyed to one

of ordinary skill in the art from reading the patent; (2) none of the patents presented by Phonometrics mention a "digital display" and, while two of the patents modify the term "display" with the term "visual," they do not require or even suggest that a "digital display" is anything but a *visual* display; and (3) the use of "readout means" in claim 7 does not preclude a "digital display means" from being *visual* under the doctrine of claim differentiation. [FN2]

> FN2. Phonometrics improperly relied on a deposition of its expert not of record. Substitute counsel admitted this error. However, the expert's statement that "readout" is a term limited to human readable form is not on point in any event.

The district court correctly interpreted the scope of the '463 claims. No genuine issue of material fact exists as to claim interpretation to preclude summary judgment and, therefore, the district court's correct interpretation stands.

IV.
INFRINGEMENT

A. Literal Infringement

[7][8] Under 35 U.S.C. § 112, ¶ 6, to satisfy a means-plus-function limitation literally, the accused device must perform the identical function required by the limitation and must incorporate the structure disclosed in the specification, or its substantial ***1389** structural equivalent, as the means for performing that function. *Johnston,* 885 F.2d at 1580, 12 USPQ2d at 1387. Phonometrics' charge of literal infringement fails because Intellicall's telephones do not perform the identical function required by the means-plus-function limitation of claim 1 in that they do not provide an instantaneous digital display of cumulative call cost in dollars and cents. [FN3]

> FN3. We need not reach the issue not relied on by the district court that Phonometrics provided no evidence of the structural equivalence of the Intellicall phones as required by § 112, ¶ 6, even assuming the identical functions were performed.

Using Phonometrics' own descriptions of the accused devices, it is clear that the Intellicall telephones do not perform the function required by claim 1's means-plus-function limitation: non-window phones do not provide any digital display and window phones (with or without the Intellistar system) display decrementing time information not cumulative call cost in dollars and cents as literally required by the claim. As a matter of law, under the proper claim interpretation, there is no literal infringement. *See Jurgens v. McKasy, supra.*

B. Infringement Under the Doctrine of Equivalents

[9] Phonometrics argues that the accused devices are equivalent overall to the claimed invention. That view of the doctrine of equivalents was rejected in *Pennwalt Corp. v. Durand-Wayland, Inc.,* 833 F.2d 931, 933-34, 4 USPQ2d 1737, 1738-39 (Fed.Cir.1987), *cert. denied,* 485 U.S. 961, 108 S.Ct. 1226, 99 L.Ed.2d 426, 485 U.S. 1009, 108 S.Ct. 1474, 99 L.Ed.2d 703 (1988). As this court has *repeatedly* stated, infringement requires that *every limitation* of a claim be met literally or by a substantial equivalent. *Key Mfg. Group, Inc. v. Microdot, Inc.,* 925 F.2d 1444, 1449, 17 USPQ2d 1806, 1810 (Fed.Cir.1991); *Johnston,* 885 F.2d at 1577, 12 USPQ2d at 1384; *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.,* 868 F.2d 1251, 1259, 9 USPQ2d 1962, 1967 (Fed.Cir.1989); *ZMI v. Cardiac Resuscitator Corp.,* 844 F.2d 1576, 1582, 6 USPQ2d 1557, 1562 (Fed.Cir.1988); *Uniroyal Inc. v. Rudkin-Wiley Corp.,* 837 F.2d 1044, 1054, 5 USPQ2d 1434, 1441 (Fed.Cir.), *cert. denied,* 488 U.S. 825, 109 S.Ct. 75, 102 L.Ed.2d 51 (1988).

[10] Phonometrics produced no evidence to establish that the limitations of claim 1 which were not met literally were met equivalently. Instead, Phonometrics argues that as non-movant on the non-infringement issue, it had no duty to submit evidence with respect to infringement under the doctrine of equivalents. This is legally incorrect. A movant may prevail by pointing out the "absence of evidence to support the nonmoving party's case" with respect to an issue on which the nonmovant bears the burden. *Celotex Corp. v. Catrett,* 477

U.S. 317, 325, 106 S.Ct. 2548, 2553, 91 L.Ed.2d 265 (1986). As the United States Supreme Court stated therein:

> In our view, the plain language of Rule 56(c) mandates the entry of summary judgment ... against a party who fails to make a showing sufficient to establish the existence of an element [*i.e.,* factor] essential to that party's case, and on which that party will bear the burden of proof at trial.

Id. at 322, 106 S.Ct. at 2552. Here, Phonometrics produced no evidence of the equivalency of the function performed by the Intellicall telephones to the function required by the means-plus-function limitation in claim 1. Such proof was an essential part of Phonometrics' case on which Phonometrics would bear the burden of proof at trial. *See Datascope Corp. v. SMEC, Inc.,* 776 F.2d 320, 325, 227 USPQ 838, 842 (Fed.Cir.1985). Thus, in light of *Celotex,* the district court properly granted Intellicall's motion for summary judgment of non-infringement under the doctrine of equivalents.

***1390** V.
CONCLUSION

The district court did not resolve any genuine issues of material fact and did not commit any errors of law in granting Intellicall's motion for summary judgment. Accordingly, the district court's decision is

AFFIRMED.

952 F.2d 1384, 21 U.S.P.Q.2d 1383

END OF DOCUMENT

30 F.3d 1475
63 USLW 2183, 31 U.S.P.Q.2d 1671
(Cite as: 30 F.3d 1475)

H

United States Court of Appeals,
Federal Circuit.

In re David C. **PAULSEN.**

No. 94-1012.

Aug. 3, 1994.

Patentee sought review of decision of United States Patent and Trademark Office Board of Patent Appeals and Interferences sustaining final rejection on reexamination of patent for portable laptop computer. The Court of Appeals, Lourie, Circuit Judge, held that: (1) specification of patent which did not clearly redefine term "computer" but merely described in general fashion features and capabilities desirable in portable computers did not remove "calculator" from definition of "computer"; (2) disclosure of box for calculator anticipated design of portable computer; and (3) patentee of portable computer failed to show that extensive evidence of commercial success was relevant to claims of obviousness and anticipation.

Affirmed.

West Headnotes

[1] Patents ⇐314(5)
291k314(5) Most Cited Cases

[1] Patents ⇐324.55(2)
291k324.55(2) Most Cited Cases

Whether patent claims are anticipated is question of fact subject to review under "clearly erroneous standard."

[2] Patents ⇐64
291k64 Most Cited Cases

[2] Patents ⇐67.1
291k67.1 Most Cited Cases

Rejection for anticipation of patent claim requires that each and every limitation of claimed invention be disclosed in single prior art reference and that reference be enabling and describe applicant's claimed invention sufficiently to have placed it in possession of person of ordinary skill in field of invention. 35 U.S.C.A. § 102(b).

[3] Patents ⇐165(4)
291k165(4) Most Cited Cases

Preamble of patent claim does not limit scope of claim when it merely states purpose or intended use of invention.

[4] Patents ⇐165(4)
291k165(4) Most Cited Cases

Terms appearing in preamble of patent claim may be deemed limitations of claim if they give meaning to claim and properly define invention.

[5] Patents ⇐101(1)
291k101(1) Most Cited Cases

To determine effect of words in preamble on patent claim, review of patent in its entirety should be made to determine whether inventors intended language to represent additional structural limitation or mere introductory language.

[6] Patents ⇐165(4)
291k165(4) Most Cited Cases

Term "computer" in preamble to patent for laptop computer was necessary limitation to claims in patent, and, thus, to anticipate claims, reference in patent for calculator had to disclose type of "computer."

[7] Patents ⇐314(5)
291k314(5) Most Cited Cases

[7] Patents ⇐324.5
291k324.5 Most Cited Cases

Claim construction is legal question addressed de novo on review.

[8] Patents ⇐167(1.1)
291k167(1.1) Most Cited Cases

Although it is proper to use specification to interpret what patentee meant by word or phrase in claim, "extraneous" limitation appearing in specification may not be added; "extraneous" refers

to limitation read into claim for specification wholly apart from any need to interpret particular words or phrases in claim.

[9] Patents ⚿101(2)
291k101(2) Most Cited Cases

[9] Patents ⚿101(4)
291k101(4) Most Cited Cases

[9] Patents ⚿168(2.1)
291k168(2.1) Most Cited Cases

When interpreting claim, words of claim are generally given their ordinary and accustomed meaning, unless it appears from specification or file history that they were used differently by inventor.

[10] Patents ⚿101(2)
291k101(2) Most Cited Cases

For purposes of construction of patent claim, "computer" refers, at most fundamental level, to device capable of carrying out calculations, and, thus, term "computer" includes "calculator"; that calculator may be limited function computer rather than full function computer does not change its inclusion in definition of computer.

[11] Patents ⚿101(5)
291k101(5) Most Cited Cases

Although inventor is free to define specific terms used to describe his invention, this must be done with reasonable clarity, deliberateness, and precision.

[12] Patents ⚿101(2)
291k101(2) Most Cited Cases

If inventor chooses to be his own lexicographer and give terms uncommon meanings, he must set out uncommon definition in some manner within patent disclosure so as to given one of ordinary skill in art notice of the change.

[13] Patents ⚿101(4)
291k101(4) Most Cited Cases

Specification of patent which did not clearly redefine term "computer" but merely described in general fashion features and capabilities desirable in portable computers did not remove "calculator" from definition of "computer" so that reference in patent for calculator met all limitations of applicant's portable computer claim.

[14] Patents ⚿16(2)
291k16(2) Most Cited Cases

Prior art reference must be considered together with knowledge of one or ordinary skill in pertinent art.

[15] Patents ⚿66(1.14)
291k66(1.14) Most Cited Cases

Disclosure of box for calculator anticipated design of applicant's portable computer, even though calculator patent did not specifically teach how to make and use portable calculator; one of ordinary skill in art was capable of providing circuitry necessary to make device operable for use as computer.

[16] Patents ⚿314(5)
291k314(5) Most Cited Cases

[16] Patents ⚿324.55(2)
291k324.55(2) Most Cited Cases

Obviousness is question of law to be determined from facts, and, thus, Board of Patent Appeal's conclusion of obviousness is reviewed for error as matter of law and underlying factual inquires are reviewed for clear error.

[17] Patents ⚿314(5)
291k314(5) Most Cited Cases

[17] Patents ⚿324.55(2)
291k324.55(2) Most Cited Cases

Whether prior art reference is "analogous" is fact question reviewed under "clearly erroneous standard."

[18] Patents ⚿16(2)
291k16(2) Most Cited Cases

Prior art references may be considered "analogous" even if they reference to different fields of endeavor, if they are reasonably pertinent to particular problem with which inventor is involved.

[19] Patents ⚿16(2)
291k16(2) Most Cited Cases

Cited references to hinges and latches used in varying items were "reasonably pertinent" to housing for portable computer, and supported finding that prior art references were "analogous"; problems encountered by inventors of portable computer were not unique to computers.

[20] Patents ⚿31.1
291k31.1 Most Cited Cases

When patentee offers objective evidence of nonobviousness, there must be sufficient relationship between that evidence and patented invention.

[21] Patents ⚿32
291k32 Most Cited Cases

Patentee seeking to provide objective evidence of nonobviousness has burden of presenting legally and factually sufficient connection between proven success and patented invention so that objective evidence will be considered in determination of nonobviousness.

[22] Patents ⚿36.2(4)
291k36.2(4) Most Cited Cases

Applicant for patent for portable computer failed to show that extensive evidence of success of its laptop computer was relevant to claims of obviousness and anticipation, and, thus, evidence of commercial success carried no weight with respect to claims.

[23] Patents ⚿324.5
291k324.5 Most Cited Cases

In reviewing decision of Board of Patent Appeals, regarding obviousness, court carefully considers prior art of record and considers claimed invention as whole, without benefit of hindsight afforded by disclosure, to determine whether multiple cited prior art references suggest desirability of combination.

Patents ⚿328(2)
291k328(2) Most Cited Cases

4,571,456. Rejected.

***1477** J. Georg Seka, Attorney, Townsend and Townsend Khourie and Crew, San Francisco, CA, argued, for appellant.

Harris Pitlick, Attorney, Com'r of Patents and Trademarks, Arlington, VA, argued, for appellee. With him on the brief was Fred E. McKelvey.

Before NIES, MICHEL, and LOURIE, Circuit Judges.

LOURIE, Circuit Judge.

AST Research, Inc., (AST) [FN1] appeals from the July 23, 1993 decision of the United States Patent and Trademark Office (PTO) Board of Patent Appeals and Interferences sustaining the final rejection upon reexamination of claims 1-4, 6, 9-12, and 18-34 of U.S. Patent 4,571,456. We affirm.

FN1. AST Research is the current record owner of the patent in issue.

***1478** BACKGROUND

The '456 patent, entitled "Portable Computer," was issued to David C. Paulsen *et al.*, on February 18, 1986. The claims of the patent are directed to a portable computer contained within a compact metal case. [FN2] A salient feature of the claimed invention is its "clam shell" configuration, in which the computer's display housing is connected to the computer at its midsection by a hinge assembly that enables the display to swing from a closed, latched position for portability and protection to an open, erect position for viewing and operation. Computers consistent with this design are commonly referred to as "laptop" computers.

FN2. Claim 1 is the broadest claim in the '456 patent and is illustrative of the claimed invention. The claim reads as follows:
1. A portable computer constructed to be

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> contained within an outer case for transport and to be erectable to a viewing and operating configuration for use, said computer comprising
> a base,
> a display housing,
> a top cover, a rear cover,
> hinge means for permitting swinging movement of the display housing about an axis of rotation adjacent the rear end of the display housing and from a closed and latched position of the display housing on the base to an erected position for viewing by an operator, and including stop means for holding the display housing at the desired angle for viewing,
> the hinge means being located in a mid portion of the base and wherein the hinge means permit swinging movement of the display housing to an erected position in which the inner surface of the display housing is held in an upward and rearwardly inclined angle for viewing by an operator in front of the computer, and
> including a keyboard in the portion of the base which is exposed by the movement of the display housing to the erected position.

On April 27, 1990, and subsequently on June 12, 1990 and October 22, 1990, requests were filed in the PTO for reexamination of the '456 patent. *See* 35 U.S.C. § 302 (1988). The requests were consolidated into a single proceeding for the reexamination of claims 1 through 34. [FN3] On August 9, 1991, the examiner issued a final office action in the reexamination rejecting claims 1-4, 6, 7, 9-12, and 18-34. Independent claims 1 and 18 were rejected under 35 U.S.C. § 102(b) (1988) as being anticipated by Japanese Application 47-14961 to Yokoyama. Additionally, claims 1-4, 6, 7, 9-12, and 18-34 were rejected under 35 U.S.C. § 103 (1988) as being obvious over the Yokoyama reference in view of other prior art. [FN4]

> FN3. As originally issued, the '456 patent contained claims 1 through 19. New claims 20 through 34 were subsequently added during reexamination.

> FN4. Claims 5, 8, and 13-17 were allowed by the examiner in the reexamination proceeding. These claims are not at issue in this appeal.

On appeal, the Board affirmed the examiner's rejections except as to claim 7. In sustaining the rejections of claims 1 and 18, the Board rejected the appellant's [FN5] contention that Yokoyama is not a proper prior art reference under sections 102 or 103. The Board concluded that although Yokoyama discloses a calculator, a calculator is a type of computer. The Board also rejected the appellant's argument that Yokoyama is a non-enabling reference. Respecting the § 103 rejection of claims 2-4, 6, 9-12, and 19- 34, the Board adopted the examiner's determination that the cited prior art would have suggested the claimed subject matter to a person of ordinary skill in the art. [FN6]

> FN5. The party in interest during the reexamination proceeding was Grid Systems Corp., the original assignee of the '456 patent.

> FN6. Because the Board adopted the examiner's position as its own, we shall refer to the examiner's findings and conclusions as those of the Board.

AST, the present assignee of the '456 patent, now appeals from the Board's decision.

DISCUSSION

Claims 1 and 18

[1][2] We first address AST's challenge to the Board's determination that claims 1 and 18 are anticipated by the Yokoyama reference. Anticipation is a question of fact subject to review under the "clearly erroneous" standard. *In re King,* 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed.Cir.1986). A rejection for anticipation under section 102 requires that each and every limitation of the claimed invention be disclosed in a single ***1479** prior art reference. *In re Spada,* 911 F.2d 705, 708, 15 USPQ2d 1655, 1657 (Fed.Cir.1990).

In addition, the reference must be enabling and describe the applicant's claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention. *Id.*

The Yokoyama reference discloses a desktop calculator contained within a housing having the form of a portable attache case. The front half of the case consists of a lid that is hinged at the midsection of the case. Connected to the inside of the lid is a display which is able to be viewed when the lid is opened to a vertical position. A keyboard is also exposed for operation when the lid is opened. When the device is to be transported, the lid is closed and latched to protect the display and the keyboard. Notwithstanding that Yokoyama discloses a device meeting the express limitations set out in claims 1 and 18 relating to a base, a display housing, a keyboard, etc., AST maintains that the claims are not anticipated by Yokoyama because that reference discloses a calculator, not a computer. [FN7] AST contends that the Board erred in construing the term "computer" broadly to encompass a calculator such as that disclosed in Yokoyama.

> FN7. AST does not dispute that all the limitations of claims 1 and 18 are otherwise described in the Yokoyama reference.

[3][4][5] We note at the outset that the term "computer" is found in the preamble of the claims at issue. The preamble of a claim does not limit the scope of the claim when it merely states a purpose or intended use of the invention. *See DeGeorge v. Bernier,* 768 F.2d 1318, 1322 n. 3, 226 USPQ 758, 761 n. 3 (Fed.Cir.1985). However, terms appearing in a preamble may be deemed limitations of a claim when they "give meaning to the claim and properly define the invention." *Gerber Garment Technology, Inc. v. Lectra Sys., Inc.,* 916 F.2d 683, 688, 16 USPQ2d 1436, 1441 (Fed.Cir.1990) (quoting *Perkin-Elmer Corp. v. Computervision Corp.,* 732 F.2d 888, 896, 221 USPQ 669, 675 (Fed.Cir.), *cert. denied,* 469 U.S. 857, 105 S.Ct. 187, 83 L.Ed.2d 120 (1984)). Although no "litmus test" exists as to what effect should be accorded to words contained in a preamble, review of a patent in its entirety should be made to determine whether the inventors intended such language to represent an additional structural limitation or mere introductory language. *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.,* 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed.Cir.1989); *In re Stencel,* 828 F.2d 751, 754, 4 USPQ2d 1071, 1073 (Fed.Cir.1987).

[6][7] In the instant case, review of the '456 patent as a whole reveals that the term "computer" is one that "breathes life and meaning into the claims and, hence, is a necessary limitation to them." *Loctite Corp. v. Ultraseal Ltd.,* 781 F.2d 861, 866, 228 USPQ 90, 92 (Fed.Cir.1984). Thus, to anticipate claims 1 and 18, the Yokoyama reference must disclose a type of "computer." *See Diversitech Corp. v. Century Steps, Inc.,* 850 F.2d 675, 678, 7 USPQ2d 1315, 1317 (Fed.Cir.1988) (prior art reference must contain preamble limitations). However, to properly compare Yokoyama with the claims at issue, we must construe the term "computer" to ascertain its scope and meaning. Claim construction is a legal question that we address *de novo. See Carroll Touch, Inc. v. Electro Mechanical Sys., Inc.,* 15 F.3d 1573, 1577, 27 USPQ2d 1836, 1839 (Fed.Cir.1993).

Pursuant to its practice of giving claims in a reexamination their broadest reasonable interpretation consistent with the specification, *see In re Etter,* 756 F.2d 852, 858, 225 USPQ 1, 5 (Fed.Cir.1985), the Board construed the term "computer" to include a calculator. The Board's interpretation was supported by authoritative lexicographic sources that confirmed that a calculator is considered to be a particular type of computer by those of ordinary skill in the art. AST alleges that the Board's interpretation was erroneous because it ignores the inventors' own definition of "computer." AST asserts that the specification plainly indicates that the inventors intended to limit the claimed invention to a device having a display with graphics and text capability, sufficient data processing capacity, communication ports, a telephone connection, ***1480** etc., features normally absent in a calculator.

[8][9] In an effort to avoid the anticipating disclosure of Yokoyama, AST engages in a *post hoc* attempt to redefine the claimed invention by impermissibly incorporating language appearing in

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the specification into the claims. Although "it is entirely proper to use the specification to interpret what the patentee meant by a word or phrase in the claim, ... this is not to be confused with adding an extraneous limitation appearing in the specification, which is improper. By 'extraneous,' we mean a limitation read into a claim from the specification wholly apart from any need to interpret ... particular words or phrases in the claim." *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.,* 849 F.2d 1430, 1433, 7 USPQ2d 1129, 1131 (Fed.Cir.), *cert. denied,* 488 U.S. 986, 109 S.Ct. 542, 102 L.Ed.2d 572 (1988). Moreover, when interpreting a claim, words of the claim are generally given their ordinary and accustomed meaning, unless it appears from the specification or the file history that they were used differently by the inventor. *See Carroll Touch,* 15 F.3d at 1577, 27 USPQ2d at 1840.

[10] The term "computer" is not associated with any one fixed or rigid meaning, as confirmed by the fact that it is subject to numerous definitions and is used to describe a variety of devices with varying degrees of sophistication and complexity. However, despite the lack of any standard definition for this ubiquitous term, it is commonly understood by those skilled in the art that "at the most fundamental level, a device is a computer if it is capable of carrying out calculations." *National Advanced Sys., Inc. v. United States,* 26 F.3d 1107, 1111-12 (Fed.Cir.1994). AST cannot dispute that a calculator falls within that basic definition. That a calculator may be a "limited function" computer as opposed to a "full function" computer does not change the fact that it is nonetheless a computer. [FN8]

> FN8. We are unpersuaded by the declarations submitted by the appellants which draw a distinction between a calculator and a computer based on comparative functions and capabilities. As the Board correctly concluded, such extrinsic evidence fails to rebut the premise that a calculator is a computer, albeit one with limited functions.

[11][12][13] Although an inventor is indeed free to define the specific terms used to describe his or her invention, this must be done with reasonable clarity, deliberateness, and precision. "Where an inventor chooses to be his own lexicographer and to give terms uncommon meanings, he must set out his uncommon definition in some manner within the patent disclosure" so as to give one of ordinary skill in the art notice of the change. *See Intellicall, Inc., v. Phonometrics, Inc.,* 952 F.2d 1384, 1387-88, 21 USPQ2d 1383, 1386 (Fed.Cir.1992). Here, the specification of the '456 patent does not clearly redefine the term "computer" such that one of ordinary skill in the art would deem it to be different from its common meaning. The specification merely describes in a general fashion certain features and capabilities desirable in a portable computer. This description, however, is far from establishing a specialized definition restricting the claimed invention to a computer having a specific set of characteristics and capabilities.

We conclude that the Board did not clearly err in determining that the Yokoyama reference meets all the limitations of claims 1 and 18 as properly construed, including the "computer" limitation.

[14][15] Alternatively, AST asserts that Yokoyama does not anticipate claims 1 and 18 because it is not enabling. AST argues that Yokoyama only discloses a box for a calculator and thus does not teach how to make and use a portable calculator. This argument, however, fails to recognize that a prior art reference must be "considered together with the knowledge of one of ordinary skill in the pertinent art." *In re Samour,* 571 F.2d 559, 562, 197 USPQ 1, 3-4 (CCPA 1978); *see also DeGeorge,* 768 F.2d at 1323, 226 USPQ at 762 (Fed.Cir.1985) (a reference "need not, however, explain every detail since [it] is speaking to those skilled in the art"). As the Board found below, the level of skill to which Yokoyama is addressed was "quite advanced" at the time the '456 patent was filed and that "one of ordinary skill in the art ***1481** certainly was capable of providing the circuitry necessary to make the device operable for use as a computer." We discern no clear error in the Board's findings and conclude as a matter of law that Yokoyama is sufficiently enabling to serve as a section 102(b) reference. [FN9] *See Gould v. Quigg,* 822 F.2d 1074, 1077, 3 USPQ2d 1302, 1303-04 (Fed.Cir.1987) (ultimate issue of enablement is one of law based on underlying factual findings).

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> FN9. We also note that under the enablement standard that AST would have us apply to Yokoyama, the '456 patent itself would be non- enabling. The '456 patent similarly relies on the knowledge and skill of those skilled in the art. If detailed disclosure regarding implementation of known electronic and mechanical components necessary to build a computer were essential for an anticipating reference, then the disclosure in the '456 patent would also fail to satisfy the enablement requirement. *See Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1569, 7 USPQ2d 1057, 1063 (Fed.Cir.1988).

Accordingly, we affirm the Board's rejection of claims 1 and 18 as being anticipated by Yokoyama. As a result, we need not review the obviousness rejections of these claims. *See In re Baxter Travenol Labs,* 952 F.2d 388, 391, 21 USPQ2d 1281, 1285 (Fed.Cir.1992) ("[S]ince anticipation is the ultimate of obviousness, the subject matter of these claims is necessarily obvious and we need not consider them further."). Additionally, because AST does not argue the patentability of claims 9-12 and 19-27 separately from that of claims 1 and 18, the appeal of these claims also fails. *See In re Albrecht,* 579 F.2d 92, 93-94, 198 USPQ 208, 209 (CCPA 1978); *In re King,* 801 F.2d at 1325, 231 USPQ at 137.

Claims 2-4, 6, and 28-34

[16] Next, AST challenges the Board's rejection of claims 2-4, 6, and 28-34 on the ground of obviousness. Obviousness is a question of law to be determined from the facts. *In re Fine,* 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed.Cir.1988). Thus, the Board's conclusion of obviousness is reviewed for error as a matter of law, *In re De Blauwe,* 736 F.2d 699, 703, 222 USPQ 191, 195 (Fed.Cir.1984), and underlying factual inquiries are reviewed for clear error, *In re Caveney,* 761 F.2d 671, 674, 226 USPQ 1, 3 (Fed.Cir.1985).

1. Non-Analogous Art

AST argues that claims 2, 6, and 28-34, which add particular features to the hinge and latch means of the display housing, [FN10] were erroneously rejected over non-analogous references directed to hinges and latches as used in a desktop telephone directory, a piano lid, a kitchen cabinet, a washing machine cabinet, a wooden furniture cabinet, or a two-part housing for storing audio cassettes. AST maintains that because the references pertain to fields of endeavor entirely unrelated to computers and are not pertinent to the problems faced by the present inventors, they do not render the claims obvious. It argues that the cited references, dealing with such articles as cabinets and washing machines, do not deal with the particular environment presented in portable computers. This argument rests on too narrow a view of what prior art is pertinent to the invention here.

> FN10. Generally, claims 2 and 6, both depending from claim 1, recite torsion spring means and recessed latch means for the display housing, respectively. Claims 28, 29, 30, 33, and 34 are directed to a portable computer having concealed hinges, and claims 31 and 32 recite recessed latch means and retractable legs, respectively.

[17][18][19] Whether a prior art reference is "analogous" is a fact question that we review under the "clearly erroneous" standard. *In re Clay,* 966 F.2d 656, 658, 23 USPQ2d 1058, 1060 (Fed.Cir.1992). Although there is little dispute that the prior art references cited here (other than Yokoyama) are not within the same field of endeavor as computers, such references may still be analogous if they are "reasonably pertinent to the particular problem with which the inventor is involved." *Id.; see also Heidelberger Druckmaschinen AG v. Hantscho Commercial Prods., Inc.*, 21 F.3d 1068, 1072, 30 USPQ2d 1377, 1379 (Fed.Cir.1994). The problems encountered by the inventors of the '456 patent were problems that were not unique to portable computers. They concerned how to connect and secure the computer's display housing to the computer while meeting certain size constraints ***1482** and functional requirements. The prior art cited by the examiner discloses various means of connecting a cover (or lid) to a device so that the cover is free to swing radially along the connection axis, as well as

means of securing the cover in an open or closed position. We agree with the Board that given the nature of the problems confronted by the inventors, one of ordinary skill in the art "would have consulted the mechanical arts for housings, hinges, latches, springs, etc." Thus, the cited references are "reasonably pertinent" and we therefore conclude that the Board's finding that the references are analogous was not clearly erroneous.

2. Secondary Considerations

In support of its contention that the Board erred in rejecting claims 2-4, 6, and 28-34 as obvious, AST points to evidence of commercial success, copying, and professional recognition of Grid laptop computers, devices covered by claims 1 and 18 of the '456 patent. For example, from the introduction of their laptop computers in 1983 to the end of 1990, Grid enjoyed cumulative sales of approximately $489 million in addition to licensing royalties of $7.5 million. Grid also received several design awards and exceptional praise from the industry press.

[20][21][22] Although such evidence is indeed impressive, AST has not shown that it is relevant to the claims at issue and thus entitled to weight. When a patentee offers objective evidence of nonobviousness, there must be a sufficient relationship between that evidence and the patented invention. *See Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392, 7 USPQ2d 1222, 1226 (Fed.Cir.), *cert. denied,* 488 U.S. 956, 109 S.Ct. 395, 102 L.Ed.2d 383 (1988). "The term 'nexus' is used, in this context, to designate a legally and factually sufficient connection between the proven success and the patented invention, such that the objective evidence should be considered in the determination of nonobviousness. The burden of proof as to this connection or nexus resides with the patentee." *Id.* Here, AST has failed to carry its burden.

AST limits its argument respecting the evidence adduced to demonstrate nonobviousness to laptop computers covered by claims 1 and 18, claims which we have previously concluded are unpatentable under section 102. [FN11] AST has not established that the commercial success, copying, and professional recognition experienced by Grid laptop computers are probative of the nonobviousness of the inventions of claims 2-4, 6, and 28-34. It has not been shown that such evidence is relevant to a computer within the scope of these claims, *i.e.,* that it is attributable to the inventions of these claims, rather than to extraneous factors such as advertising and marketing or to the features possessed by the computers of claims 1 and 18. Because AST has failed to establish a sufficient legal relationship between the purported evidence of nonobviousness and the claimed invention, evidence pertinent to claims 1 and 18 therefore carries no weight with respect to claims 2-4, 6, and 28-34.

> FN11. The only evidence connecting the purported commercial success and professional praise with the '456 patent is the declaration of J. Georg Seka, counsel for AST, stating that claims 1 and 18 cover the Grid "Compass" laptop computer and certain models made by Toshiba. Even assuming that a nexus exists as to those two claims, evidence of nonobviousness is irrelevant for patentability purposes when an invention is anticipated under section 102.

3. Obviousness Generally

[23] Beyond what we have said respecting the applicability of the cited prior art and the asserted evidence of secondary considerations, we have considered AST's basic contention that the prior art does not suggest the invention of the rejected claims and view it to be unpersuasive. In reviewing the Board's obviousness conclusions, we have been guided by the well-settled principles that the claimed invention must be considered as a whole, multiple cited prior art references must suggest the desirability of being combined, and the references must be viewed without the benefit of hindsight afforded by the disclosure. *See Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n. 5, 229 USPQ 182, 187 n. 5 (Fed.Cir.), *cert. denied,* ***1483** 479 U.S. 827, 107 S.Ct. 106, 93 L.Ed.2d 55 (1986) . We have carefully reviewed the prior art of record and conclude that the Board did not err in rejecting claims 2-4, 6, and 28-34 as having been obvious.

CONCLUSION

The Board did not clearly err in rejecting claims 1 and 18 as being anticipated by the Yokoyama reference. Consequently, the rejection of claims 9-12 and 19-27 must also be affirmed. The Board did not err in rejecting claims 2-4, 6, and 28-34 as being obvious over Yokoyama and other prior art. Accordingly, we affirm the decision of the Board.

AFFIRMED.

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C

Court of Customs and Patent Appeals.

Application of HILL.

Patent Appeal No. 5277.

April 22, 1947.
Rehearing Denied May 29, 1947.

Appeal from the Board of Appeals of the United States Patent Office, Serial No. 510,512.

Proceedings in the matter of the application of Lyman P. Hill for a patent. From a decision of the Board of Appeals of the United States Patent Office affirming a decision of the examiner rejecting certain claims of the application, the applicant appeals.

Affirmed.

West Headnotes

[1] Patents ⇐101(5)
291k101(5) Most Cited Cases
(Formerly 291k101)

A generic claim must accurately and definitely define invention, to entitle applicant to a patent.

[2] Patents ⇐16.2
291k16.2 Most Cited Cases
(Formerly 291k16)

Unless an invention is capable of accurate definition, it is not patentable.

[3] Patents ⇐66(1)
291k66(1) Most Cited Cases

The inadvertent granting of claims to one inventor is of itself not a reason for granting claims to another.

[4] Patents ⇐101(6)
291k101(6) Most Cited Cases
(Formerly 291k101)

Certain claims of application for patent for improvement in dyed textiles and methods and compositions for producing same calling for a binder of lacquer comprising a carbamide formaldehyde resin were properly rejected as not accurately defining the invention.

****367 *1062** Keith Misegades, of New York City (Rolf E .Schneider, of New York City, of counsel), for appellant.

W. W. Cochran, of Washington, D.C. (H. S. Miller, of Washington, D.C., of counsel), for the Commissioner of Patents.

Before GARRETT, Presiding Judge, and BLAND, HATFIELD, JACKSON, and O'CONNELL, Associate Judges.

JACKSON, Associate Judge.

This is an appeal from a decision of the Board of Appeals of the United States Patent Office affirming that of the examiner finally rejecting claims 2 and 3 of an application for a patent for 'Improvements ***1063** in Dyed Textiles and Methods and Compositions for Producing Same.'

The claims read as follows:

'2. A dye bath for textiles comprising an emulsion of a water-immiscible pigmented lacquer distributed in a continuous aqueous phase, the binder of the lacquer comprising a carbamide formaldehyde resin soluble in organic solvents, and comprising not over 2.5% of the total dye bath, and being present in at least twice the volume of the pigment, the solvent of the lacquer being no more volatile than toluol at 25 degrees C.

'3. A dye bath for textiles comprising an emulsion of a water-immiscible pigmented lacquer distributed in a continuous aqueous phase, the binder of the lacquer comprising a carbamide formaldehyde resin soluble in organic solvents, and an alkyd resin compatible therewith, said resins comprising not over 1.5% of the total dye bath, and being present in at least twice the volume of the pigment, the solvent of the lacquer being no more volatile than toluol at 25 degrees C.'

**368 The subject matter of the invention may be understood from a reading of the claims.

The application was prosecuted under what is known as dual prosecution, claims 1, 2 and 3 before Division 50 and claims 4 to 14, inclusive, before Division 38.

The claims of the first group were rejected by the Primary Examiner as unpatentable over the patent to Jenett et al., 2,196,669, April 30, 1940, and he further rejected claims 2 and 3 as being indefinite in the use of the word 'carbamide.'

In his specification appellant states that he obtains best results with the 'carbamide formaldehyde resins, including the resins made from formaldehyde and urea, thiourea, melamine, and other urea derivatives and substituted ureas.'

The examiner considered the wording of the quotation objectionable for the stated reason that the meaning of the term 'carbamide' is distorted. One of the reasons for his holding was that in Webster's New International Dictionary, Second Edition, carbamide is defined as being synonymous with the word 'urea'. He then stated 'Melamine is not urea.' The examiner pointed out that no examples were set forth in the specification to make clear the meaning of 'urea derivatives' and 'substituted ureas', stating that the scope of the term 'derivative' is dubious and that certain 'substituted ureas' such as tri-ethyl urea and tetra-ethyl urea do not form resins with formaldehyde. He, therefore, held the above quotation from the specification to be objectionable as placing a distorted meaning on the word 'carbamide'. By reason of those view he held claims 2 and 3 to be too indefinite, citing the case of In re Hegan, 97 F.2d 86, 25 C.C.P.A. (Patents) 1182, to support his statement that ' * * * a definition in the specification which distorts the meaning of an accepted term renders the claims confusing.'

*1064 From the decision rejecting claims 1, 2 and 3 appeal was taken to the Board of Appeals.

Claims 4 to 13, inclusive, were rejected by the examiner as unpatentable over the patent to Jenett et al., supra, and the patent to Jennings, 2,334,199, November 16, 1943, and from his decision appellant appealed.

The Board of Appeals held that all of the claims were patentable over the prior art and allowed claims 1 and 4 to 14, inclusive. The examiner's decision was affirmed by the board with respect to claims 2 and 3 on the ground that they are indefinite and, therefore, do not define the invention.

The issue here is whether or not the claims are indefinite and whether or not they do or do not define the invention.

Appellant contends that a basis for a generic claim is contained in the specification in a recital of the resins he prefers as reaction products of formaldehyde with carbamides, such as urea, thiourea, melamine, urea derivatives and urea substitution products. He argues that in that language he had reference to a common property possessed by those named substances and that ' * * * there is little dispute that this property was the similarity of chemical structure and behavior.' Therefore, he states, he properly used the indefinite article with the word 'carbamide.'

It is said by appellant that the work 'carbamide' is applied primarily to the insomer of urea and is recognized as being the simplest in a series of homologues and that in his application appellant so used.

The tribunals below held 'carbamide' to be a term that does not relate to a group or series of compounds, but is confined to the single definite compound 'urea'.

Appellant in his brief states that the examiner, in his rejection on the ground of indefiniteness, relied on the dictionary definition of the word 'carbamide' and points out that in the case of Application of Jones, 149 F.2d 501, 32 C.C.P.A. (Patents) 1020, we held that in technical questions, such as this, standard textbook definitions are preferable to those found in general dictionaries.

The Board of Appeals in its decision denying appellant's request for reconsideration stated that according to the chemical textbooks available 'carbamide' is a definite individual compound and noted that appellant had cited no such authority to the contrary.

[1][2] In order to sustain appellant's contention that

he is entitled to a generic ****369** claim as aforesaid, such claim must accurately and definitely define his invention. In re Hegan, supra. Unless an invention is capable of accurate definition, it cannot be held to be patentable. United Carbon Co. et al. v. Binney & Smith Co., 217 U.S. 228, 63 S.Ct. 165, 87 L.Ed. 232.

***1065** Had appellant limited his claims to 'carbamide formaldehyde resin' in all probability they would have been allowed, but in that event they would be specific to only one of the resins. Instead it may be noted that the claims call for 'a carbamide formaldehyde resin' and if the recital in the specification heretofore quoted does not accurately define 'carbamide resins' the claims must be held to be indefinite.

In support of his position appellant quotes from Funk & Wagnalls New Standard Dictionary as follows:

'Carbamid, n. chem. Urea or one of its isomers.

'urea, n. chem. 1. A very soluble colorless crystalline compound CO(NH sub2) sub2) * * * 2. A derivative of urea.' (Italics quoted)

And from the Webster New International Dictionary as follows:

'carbamide, n. Also -mid. Chem. Urea.

'urea, n. Biochem. a. A very soluble crystalline nitrogenous compound, CO(NH sub2) 2. * * * - called also carbamide * * * b. Hence, any of various derivatives of the above compound: as, alkylated ureas.(Italics quoted)

[3] Appellant stated that those definitions recognize the word 'urea' as having a broader meaning than a single specific chemical compound and, therefore, his use of the expression 'a carbamide', as called for in the claims, should not be objectionable. While he recognizes the rule that inadvertent granting of claims to one inventor is of itself not a reason for granting claims to another, citing the case of In re Engelhart, 40 F.2d 760, 17 C.C.P.A. (Patnets) 1244, he argues in his brief that ' * * * an established practice of the Patent Office evidenced by five or six freshly issued patents from the same art ought not be changed without strong reasons.'

We find nothing in the record here which shows any 'established practice' opposed to the reasoning in the decisions below. The examiner stated that in the case of Ex parte Clifford, 63 USPQ 19, an analogous question was involved. In that case it was sought to define the term 'aliphatic' in a manner to include compounds not normally considered to be 'aliphatic'. The board there held that to be improper.

The examiner stated that it had been held by the Board of Appeals in an application, Serial No. 284,213, assigned to appellant's assignee and prosecuted by the same counsel as appears herein, the expression ' a carbamide' was indefinite based on substantially the same definition as here. Counsel for appellant has not shown that statement to be inaccurate.

While it is trite, as is contended here, to say that a patent specification may explain the language of the claim, it is incorrect, as pointed out by the solicitor in his brief, to say ' * * * the specification may distort a term to mean something it does not mean.'

***1066** [4] We do not think we would be justified in reversing the decision of the board in view of the fact that no standard work on chemistry has been cited to us, nor have we been able to find one which would support appellant's position, even though the dictionary definitions cited by him would seem to support his contention. According to available chemical authorities there is only one 'carbamide' and, accordingly, we are compelled to hold that claims 2 and 3 do not accurately define appellant's invention.

The decision appealed from must be affirmed.

***1062** Affirmed.

END OF DOCUMENT

133 F.3d 1473
45 U.S.P.Q.2d 1429
(Cite as: 133 F.3d 1473)

Briefs and Other Related Documents

United States Court of Appeals,
Federal Circuit.

MULTIFORM DESICCANTS, INC.,
Plaintiff-Cross Appellant,
v.
MEDZAM, LTD., Defendant-Appellant.

Nos. 96-1255, 96-1274.

Jan. 15, 1998.

Patentee brought action against competitor, alleging infringement of patent for packet which absorbed and immobilized liquid and contained treating material. The United States District Court for the Western District of New York, Elfvin, J., 1995 WL 737929, entered judgment in favor of competitor, did not decide issue of patent validity, and denied competitor's request for attorney fees. Patentee appealed, and competitor cross-appealed. The Court of Appeals, Pauline Newman, Circuit Judge, held that: (1) "degradable" envelope, within meaning of patent, was one that at least partially dissolved in liquid, so accused device was not infringing; (2) claims containing means- for language to describe envelope were not infringed; (3) accused device did not infringe patent under doctrine of equivalents; (4) competitor was not entitled to ruling on patent's validity; and (5) competitor was not entitled to attorney fees.

Affirmed.

West Headnotes

[1] Patents ⇐226.6
291k226.6 Most Cited Cases

Patent infringement occurs when device, composition, or method that is literally covered by patent claims or is equivalent to claimed subject matter is made, used, or sold, without authorization of patent holder, during term of patent. 35 U.S.C.A. § 271.

[2] Patents ⇐165(3)
291k165(3) Most Cited Cases

Since full and complete understanding of scope of patent claims is requisite to determining whether patent is infringed, technical terms or words of art or special usages in claims, if in dispute, are construed or clarified by court before construed claims are applied to accused device.

[3] Patents ⇐324.55(1)
291k324.55(1) Most Cited Cases

On appellate review, in patent infringement action, Court of Appeals construes claims, determining correct construction de novo.

[4] Patents ⇐101(2)
291k101(2) Most Cited Cases

Term "degradable" which described claimed envelope in patent for packet which absorbed and immobilized liquid and contained treating material did not mean any type of loss in containment function of envelope but meant that envelope at least partially dissolved in liquid, in view of patent's specification, and claims were thus not infringed by accused device with envelope that burst open but did not dissolve.

[5] Patents ⇐165(1)
291k165(1) Most Cited Cases

It is person of ordinary skill in field of invention through whose eyes patent claims are construed; such person is deemed to read words used in patent documents with understanding of their meaning in the field, and to have knowledge of any special meaning and usage in the field.

[6] Patents ⇐167(1)
291k167(1) Most Cited Cases

When meaning of term is sufficiently clear in patent specification, that meaning shall apply.

[7] Patents ⇐235(2)
291k235(2) Most Cited Cases

Patent claim for packet which absorbed and immobilized liquid and contained material to treat such liquid, which described packet envelope in

terms of its function of containing and releasing absorbing and treating materials, was not infringed by device with envelope that had porous envelope that did not disintegrate by dissolution, since accused envelope was not equivalent to starch paper described in patent's specification, which dissolved and disintegrated. 35 U.S.C.A. § 112.

[8] Patents ⚿226.7
291k226.7 Most Cited Cases

Patent claim containing functional limitation written in means-for form is literally infringed when accused device performs function stated in claim, by means of structure, material, or acts described in specification or equivalents thereof. 35 U.S.C.A. § 112.

[9] Patents ⚿226.7
291k226.7 Most Cited Cases

Patent claims written in means-for form do not, by virtue of that form, acquire scope as to function beyond that which is supported in specification, or as to structure beyond equivalents of that shown in specification. 35 U.S.C.A. § 112.

[10] Patents ⚿226.7
291k226.7 Most Cited Cases

In determining whether there is literal infringement of patent claim written in means-for form, first step in interpretation of claim is determination of meaning of words used to describe claimed function, if such meaning is in dispute. 35 U.S.C.A. § 112.

[11] Patents ⚿324.55(2)
291k324.55(2) Most Cited Cases

District court's finding of non-infringement of patent is reviewed for clear error.

[12] Patents ⚿165(5)
291k165(5) Most Cited Cases

Doctrine of claim differentiation can not broaden patent claims beyond their correct scope, determined in light of specification and prosecution history and any relevant extrinsic evidence.

[13] Patents ⚿237
291k237 Most Cited Cases

Accused device did not infringe patent for packet which absorbed and immobilized liquid and contained treating material, under doctrine of equivalents, because porous envelope of accused device performed function of releasing its contents in substantially different way than envelope claimed in patent, which dissolved and disintegrated upon contact with liquid.

[14] Patents ⚿237
291k237 Most Cited Cases

In determining whether patent is infringed under doctrine of equivalents, court determines whether there is any estoppel derived from prosecution history that bars remedy even when there is technologic equivalency, for patentee is precluded from reaching, under doctrine of equivalents, subject matter that was disclaimed in order to obtain patent.

[15] Patents ⚿237
291k237 Most Cited Cases

Interchangeability is significant factor in determination of equivalency, upon claim of patent infringement under doctrine of equivalents.

[16] Patents ⚿314(2)
291k314(2) Most Cited Cases

District court was not required to determine issue of patent validity after finding of non-infringement, despite alleged infringer's request for such determination, where alleged infringer did not file counterclaim for declaration of invalidity, although, generally, trial courts should decide all litigated issues, in interest of finality.

[17] Patents ⚿324.54
291k324.54 Most Cited Cases

District court's denial of attorney fees under patent statute is subject to reversal only if finding that case is not exceptional is clearly erroneous and ensuing refusal of attorney fees is abuse of discretion. 35 U.S.C.A. § 285.

[18] Patents ⚿325.11(2.1)
291k325.11(2.1) Most Cited Cases

Defendant competitor was not entitled to attorney's fees upon finding of non- infringement in patentee's action alleging infringement of patent for packet which absorbed and immobilized liquid and contained treating material, as competitor failed to establish bad faith or inequitable conduct by patentee. 35 U.S.C.A. § 285.

[19] Patents ⚿325.11(2.1)
291k325.11(2.1) Most Cited Cases

It is neither illegal nor bad faith for patent applicant to amend claims in view of competitor's product, for purpose of determining whether defendant is entitled to attorney fees in infringement action. 35 U.S.C.A. § 285.

Patents ⚿328(2)
291k328(2) Most Cited Cases

4,124,116. Cited as prior art.

Patents ⚿328(2)
291k328(2) Most Cited Cases

4,853,266. Not infringed.
***1475** Michael R. McGee, McGee & Gelman, Buffalo, NY, argued for plaintiff-cross appellant.

Jeremiah J. McCarthy, Phillips, Lytle, Hitchcock, Blaine & Huber, Buffalo, NY, argued for defendant-appellant.

Before NEWMAN, CLEVENGER, and SCHALL, Circuit Judges.

PAULINE NEWMAN, Circuit Judge.

In this patent suit, the United States District Court for the Western District of New York [FN1] held that United States Patent No. 4,853,266, entitled "Liquid Absorbing and Immobilizing Packet Containing a Material for Treating the Absorbed Liquid" (the '266 patent), owned by Multiform Desiccants, Inc., was not infringed by the similar product sold by Medzam, Ltd. The district court entered judgment in favor of Medzam, did not decide the issue of patent validity, and denied Medzam's request for attorney fees. Multiform appeals the judgment of non-infringement, and Medzam appeals the denial of attorney fees and the decision not to reach the issue of validity.

FN1. *Multiform Desiccants, Inc. v. Medzam, Ltd.*, No. 91-CV- 0095E(H), 1995 WL 737929 (W.D.N.Y. Dec. 7, 1995)
.

THE TECHNOLOGY

The invention described and claimed in the '266 patent is a packet for use in controlling spilled liquids. In typical use the packet is placed in an outer shipping container that encloses an inner container holding a hazardous liquid such as medical waste or body fluids. Should the inner container break or leak, the released liquid encounters the packet in the outer container. The packet envelope, which is made of a soluble material, disintegrates and releases materials that absorb, immobilize, and treat the spilled liquid. The absorbing and immobilizing material is preferably sodium polyacrylate, a known absorbent that expands and gels on contact with liquid. The treating material may be a known disinfectant, scent, deodorizer, etc., depending on the intended use of the packet.

Medzam's accused packet, called the Red-Z Zafety Pac, is designed and sold for the same uses as the Multiform packet. The Medzam envelope is made of porous material such as is used for tea bags, and contains the ***1476** known absorbing and immobilizing material potassium polyacrylate and a disinfectant. When spilled liquid penetrates the porous envelope, the polyacrylate inside the envelope starts to absorb and expand. The expanding absorbent splits open the envelope, releasing its contents for further absorption.

LITERAL INFRINGEMENT

[1][2][3] Patent infringement occurs when a device (or composition or method), that is literally covered by the claims or is equivalent to the claimed subject matter, is made, used, or sold, without the authorization of the patent holder, during the term of the patent. *See* 35 U.S.C. § 271. The claims are concise statements of the subject matter for which the statutory right to exclude is secured by the grant

of the patent. Since a full and complete understanding of the scope of the claims is requisite to determining whether the patent is infringed, technical terms or words of art or special usages in the claims, if in dispute, are construed or clarified by the court before the construed claims are applied to the accused device. On appellate review the Federal Circuit again construes the claims, determining *de novo* the correct construction. *See Markman v. Westview Instruments,* 52 F.3d 967, 979-81, 34 USPQ2d 1321, 1329-31 (Fed.Cir.1995) (*en banc*), *aff'd,* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577, 38 USPQ2d 1461 (1996).

On occasion the issue of literal infringement may be resolved with the step of claim construction, for upon correct claim construction it may be apparent whether the accused device is within the claims. *See, e.g., Strattec Security Corp. v. Gen. Automotive Specialty,* 126 F.3d 1411, 1419, 44 USPQ2d 1030, 1036 (Fed.Cir.1997); *Applied Materials, Inc. v. Advanced Semiconductor Materials America, Inc.,* 98 F.3d 1563, 1572, 40 USPQ2d 1481, 1488 (Fed.Cir.1996). The district court so viewed this case. Although the cause was fully tried to a jury, after trial the judge dismissed the jury without requesting a verdict, citing the Federal Circuit's decision in *Markman* and stating that "This question is one of claim construction, a question of law."

Claims 1 and 6

[4] In the '266 patent the packet is claimed as a combination of the degradable envelope, the absorbing material, and the treating material. A second group of claims describes the envelope in terms of its function, in the form authorized by 35 U.S.C. § 112 ¶ 6; these claims are discussed *post.* Claims 1 and 6 are representative of the first group of claims:

> 1. A packet for absorbing and immobilizing a liquid comprising *an envelope which is degradable* in said liquid, a first material in said envelope for absorbing and immobilizing said liquid, and a second material confined in said envelope for additionally treating said liquid which is absorbed and immobilized to nullify a specific undesirable quality thereof.
>
> 6. In an outer container having an inner container with liquid from which said liquid can leak, an absorbent packet located between said inner and outer containers for absorbing and immobilizing said liquid within said outer container in the event of leakage of said liquid from said inner container comprising *an envelope which is degradable* in said liquid, a first material in said envelope for absorbing and immobilizing said liquid, and a second material confined in said envelope for additionally treating said liquid which is absorbed and immobilized to nullify a specific undesirable quality thereof.

(Emphases added.) Medzam conceded that its packet contains all of the elements of claims 1 and 6 except the "degradable" envelope. Medzam argued that its envelope is not degradable, when that term is correctly construed, and thus that the claims are not infringed.

The disputed issue is the meaning of the term "degradable" in characterizing the claimed envelope. The district court defined this term with an eye to the accused envelope. The court held that the terms "degrade" and "degradable," as used in the '266 patent, mean that the envelope at least partially dissolves and thereby disintegrates in the liquid. The court held that this meaning of "degradable" does not include the mode of operation of the Medzam packet, wherein the envelope bursts open by expansion of the contents but the envelope itself does not dissolve and disintegrate by direct action of the liquid.

***1477** Multiform states that this claim construction is incorrect, and that upon correct construction a finding of infringement is inevitable. Multiform argues that "degradable" must first be construed based on the '266 patent documents, without reference to the accused device, *see Jurgens v. McKasy,* 927 F.2d 1552, 1560, 18 USPQ2d 1031, 1037 (Fed.Cir.1991) ("claim is construed without regard to the accused product"); *Scripps Clinic & Research Found. v. Genentech, Inc.,* 927 F.2d 1565, 1580, 18 USPQ2d 1001, 1013 (Fed.Cir.1991) (the words of the claims are independently construed, focussing on the disputed elements), and that as used in the '266 patent "degradable" is not limited to dissolution and disintegration, but means any loss in the containment function of the envelope. Multiform cites dictionaries showing this broader meaning, and states that a person of ordinary skill would construe "degradable," as applied to these envelopes, as meaning a loss in their containment function.

[5] It is the person of ordinary skill in the field of the invention through whose eyes the claims are construed. Such person is deemed to read the words used in the patent documents with an understanding of their meaning in the field, and to have knowledge of any special meaning and usage in the field. The inventor's words that are used to describe the invention--the inventor's lexicography--must be understood and interpreted by the court as they would be understood and interpreted by a person in that field of technology. Thus the court starts the decisionmaking process by reviewing the same resources as would that person, *viz.*, the patent specification and the prosecution history. These documents have legal as well as technological content, for they show not only the framework of the invention as viewed by the inventor, but also the issues of patentability as viewed by the patent examiner.

During patent prosecution Multiform submitted dictionary definitions of "degradable" from *Webster's New Collegiate Dictionary* (1976), explaining the submission as follows:

> The word "degrade" includes the definitions of "to deprive of standing or true function" and "to impair in respect of some physical property." Thus when the envelope is dry and not degraded, its true function is to contain its contents. However, once it is exposed to liquid, it is deprived of its standing or true function and it has its physical property of containing its contents impaired.

Multiform states that this definition is comprehensive of the degradation of the Medzam envelope that bursts apart and thus loses its true function, and is not limited to an envelope that degrades by dissolving. Multiform states that it is not necessary for the packet to disintegrate in order to degrade. Medzam responds that Multiform offered these definitions only after Multiform became aware of the Medzam packet, and that the definitions are at odds with the plain reading of the specification.

[6] Multiform argues that, in keeping with the rule that an inventor may be his own lexicographer, its definition of "degradable" must prevail. When the meaning of a term is sufficiently clear in the patent specification, that meaning shall apply. *See Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1388, 21 USPQ2d 1383, 1387 (Fed.Cir.1992) ; *Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 889, 221 USPQ 1025, 1031 (Fed.Cir.1984). This rule of construction recognizes that the inventor may have imparted a special meaning to a term in order to convey a character or property or nuance relevant to the particular invention. Such special meaning, however, must be sufficiently clear in the specification that any departure from common usage would be so understood by a person of experience in the field of the invention.

Thus we review, *de novo,* the meaning of "degradable" in claims 1 and 6. We start with the specification. *See Slimfold Mfg. Co. v. Kinkead Industries, Inc.*, 810 F.2d 1113, 1116, 1 USPQ2d 1563, 1566 (Fed.Cir.1987) ("Claims are not interpreted in a vacuum, but are part of and are read in light of the specification.") The '266 specification describes the Multiform envelope as made of soluble starch, such that "when the aqueous solution comes into contact with the envelope, it degrades it ...." '266 patent, col. 1, lines 21-23. The specification explains that degradation of the envelope results from dissolution of the soluble envelope material. The specification illustrates an envelope ***1478** whose inner layer contains a dot matrix pattern of insoluble material that permits heat-sealing, and in discussing this pattern the specification explains that it is the soluble portion that results in degradation of the envelope: "The dot matrix pattern, or any other suitable discontinuous pattern, permits liquid, which may not otherwise be able to dissolve the material of coating 17, to completely degrade envelope 11 because there are uncoated spaces 18 between the dots of the coating 17 through which liquid can pass. " '266 patent, col. 3, lines 5-10. The district court discussed the specification in reaching its conclusion, and also reviewed the prosecution history. The court referred to United States Patent No. 4,124,116 to McCabe, which describes a water-soluble envelope that releases its contents upon contact with spilled aqueous liquid. The McCabe envelope is made of two sheets, one of which is made of soluble starch. The district court observed that "Multiform distinguished this invention to the PTO, not by asserting a distinction between degrade and dissolve, but by noting that the '266 Patent included a second material for treating the absorbed liquid." 1995 WL 737929 at *11. We agree that this analysis is correct.

The district court concluded that the specification and the prosecution history do not support a meaning of "degradable" that would include an envelope that bursts open from inner pressure without any dissolution. The district court defined "degradable" in light of the mode of action of the accused device, a pragmatic expedient relevant to the issue in litigation. Thus the court held that Multiform's dictionary definitions added during patent prosecution, although stating a broad definition of "degradable," could not serve to enlarge the scope of the claims in order to cover the Medzam device. The district court did not accept Multiform's position that the dictionary definitions provided during the prosecution simply clarified the inventor's original usage of "degradable." We agree with this analysis.

Courts must exercise caution lest dictionary definitions, usually the least controversial source of extrinsic evidence, be converted into technical terms of art having legal, not linguistic, significance. The best source for understanding a technical term is the specification from which it arose, informed, as needed, by the prosecution history. The evolution of restrictions in the claims, in the course of examination in the PTO, reveals how those closest to the patenting process--the inventor and the patent examiner--viewed the subject matter. *See Hoechst Celanese Corp. v. BP Chemicals Ltd.*, 78 F.3d 1575, 1578, 38 USPQ2d 1126, 1129 (Fed.Cir.1996) ("A technical term used in a patent document is interpreted as having the meaning that it would be given by persons experienced in the field of the invention, unless it is apparent from the patent and the prosecution history that the inventor used the term with a different meaning.") When the specification explains and defines a term used in the claims, without ambiguity or incompleteness, there is no need to search further for the meaning of the term.

We conclude that the meaning of "degradable" in claims 1 and 6 (and the claims dependent thereon) is limited to the dissolution/degradation of the envelope as described in the specification. The court correctly excluded the meaning whereby the envelope "degrades" by bursting instead of dissolving, and correctly held that "degradable" means that there must be at least partial dissolution of the envelope. Upon this claim interpretation, the district court concluded that there could not be literal infringement of claims 1 and 6. We agree, for this claim interpretation eliminated the Medzam envelope, which bursts but does not dissolve, from the literal meaning and scope of the claims.

Claims 11 to 15

[7] During pendency of the '266 application claims 11-18 were added to describe the envelope in terms of its function, in accordance with the form authorized by 35 U.S.C. § 112 ¶ 6. [FN2] Claims 11-15, asserted against the Medzam packet, do not contain the word "degradable." Claim 11 is representative:

> FN2. § 112 ¶ 6. An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

> ***1479** 11. A packet for absorbing and immobilizing a liquid comprising a first material which will absorb and immobilize said liquid, a second material for additionally treating said liquid which is absorbed and immobilized to nullify a specific undesirable quality of said liquid, and *means for containing said first and second materials while said means are dry and for releasing said first and second materials on contact of said means with said liquid* to thereby permit said first and second materials to absorb and immobilize and treat said liquid.

(Emphasis added.) In adding these "means-for" claims Multiform's attorney wrote to the patent examiner that the word "degradable" was ambiguous in that it could be interpreted "as synonymous with 'disintegrate,' which is not necessary for the packet to function properly." The attorney submitted the dictionary definitions that we discussed in connection with claims 1 and 6. Multiform argues that the grant of claims 11-15 makes clear that neither the applicant nor the examiner viewed the invention as limited to a dissolving, disintegrating envelope.

[8][9] A claim containing a functional limitation

written in means-for form is literally infringed when the accused device performs the function stated in the claim, by means of structure, material, or acts described in the specification or equivalents thereof. *See Texas Instruments, Inc. v. United States Int'l Trade Comm'n,* 805 F.2d 1558, 1562, 231 USPQ 833, 834-35 (Fed.Cir.1986) (equivalency of structure, materials, or acts with respect to the claimed function is a matter of literal infringement). Thus § 112 ¶ 6 facilitates the mechanics of claiming, by permitting the use of functional terms in claims while incorporating, from the specification, the breadth as well as the details of how the function is performed. However, claims written in the means-for form of § 112 ¶ 6 do not, by virtue of this form, acquire a scope as to the function beyond that which is supported in the specification, or as to the structure beyond equivalents of that shown in the specification.

[10] In determining whether there is literal infringement under § 112 ¶ 6, the first step in interpretation of the claim is determination of the meaning of the words used to describe the claimed function, if such meaning is in dispute. This claim interpretation is deemed to be a matter of law, and is reviewed *de novo* on appeal. *Markman,* 52 F.3d at 979-81, 34 USPQ2d at 1329- 31. Medzam conceded that all of the elements of claim 11 are present in its device, except for the element now claimed in terms of its function of containing and releasing the absorbing and treating materials.

The district court found that the function of containing and releasing the contents of the packet does not embrace all envelopes whose contents are released on contact with liquid. The court stressed the description of the envelope in the '266 specification as made of "degradable starch paper," "degradable in water and other liquids," "able to dissolve," and "practically entirely disintegrated," in finding that the function of releasing the envelope contents must be performed by an envelope that disintegrates by dissolution. The court then found that since the Medzam envelope does not dissolve, it does not perform the function required by claims 11-15.

[11] Multiform argues that the function of containing and releasing the contents of the envelope is plainly performed by the Medzam envelope, and that even if the Medzam envelope's structure and material are not the same as described in the '266 specification, they are equivalent means of performing the same function. The district court found that the structure and material of Medzam's porous envelope, which works by penetration of the liquid through the envelope fabric, are not equivalent to the starch paper described in the ' 266 specification, which dissolves and disintegrates. The district court's finding of non-infringement is reviewed for clear error. *Biodex Corp. v. Loredan Biomedical, Inc.,* 946 F.2d 850, 852, 20 USPQ2d 1252, 1254 (Fed.Cir.1991); *Durango Associates, Inc. v. Reflange, Inc.,* 843 F.2d 1349, 1357, 6 USPQ2d 1290, 1295 (Fed.Cir.1988).

[12] Multiform invokes the doctrine of claim differentiation, which presumes that there is a difference in scope among the claims of a patent. *Tandon Corp. v. United States Int'l Trade Comm'n,* 831 F.2d 1017, 1023, 4 USPQ2d 1283, 1288 (Fed.Cir.1987); ***1480** *Autogiro Co. of America v. United States,* 181 Ct.Cl. 55, 384 F.2d 391, 404, 155 USPQ 697, 708 (1967). Multiform states that this doctrine requires that claims 11-15 be viewed separately from claims 1 and 6, and that a broader interpretation is warranted because claims 11-15 are not limited to a degradable envelope, but are directed primarily to the function of containing and releasing the contents. However, the doctrine of claim differentiation can not broaden claims beyond their correct scope, determined in light of the specification and the prosecution history and any relevant extrinsic evidence. As explained in *Tandon,* 831 F. 2d at 1023, 4 USPQ2d at 1288, claims that are written in different words may ultimately cover substantially the same subject matter. *See also Moleculon Research Corp. v. CBS, Inc.,* 793 F.2d 1261, 1269, 229 USPQ 805, 810 (Fed.Cir.1986) (affirming district court's construction of a claim although it rendered a dependent claim redundant). We affirm the district court's ruling that the functions stated in claims 11-15, as performed by the structure and materials shown in the '266 specification and equivalents thereof, are not literally met in the Medzam envelope.

DOCTRINE OF EQUIVALENTS

[13] Multiform argues that even on the district court's interpretation of the claims, the Medzam packet infringes under the doctrine of equivalents.

The doctrine of equivalents, of common law origin, serves to prevent a "fraud on the patent." *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605, 608, 70 S.Ct. 854, 856, 94 L.Ed. 1097, 85 USPQ 328, 330 (1950). Thus the doctrine of equivalents balances the purpose of fairness to inventors lest the patent be unjustly circumvented, against the purpose of patent claims to state clear boundaries of the patent grant, in fair notice of its scope. *Warner- Jenkinson Co. v. Hilton Davis Chem. Co.*, --- U.S. ----, ----, 117 S.Ct. 1040, 1051, 137 L.Ed.2d 146, 41 USPQ2d 1865, 1873 (1997).

Applying *Graver Tank* and *Warner-Jenkinson,* we review whether the Medzam porous envelope performs substantially the same function as that of the dissolving envelope of the '266 patent and, if so, whether it is performed in substantially the same way to achieve substantially the same result. *Graver Tank,* 339 U.S. at 608, 70 S.Ct. at 856, 85 USPQ at 330. We also apply the requirement that all of the claim elements or functions must be present in the accused device, literally or by an equivalent element or function. *Warner-Jenkinson,* --- U.S. at ----, 117 S.Ct. at 1054, 41 USPQ2d at 1875.

[14] Determination of infringement under the doctrine of equivalents occurs after the claims have been construed as a matter of law. The trier of fact, applying the claims as construed, finds whether the accused device, element by element, is equivalent to that which has been patented. The court also determines whether there is any estoppel derived from the prosecution history that bars remedy even when there is technologic equivalency, for the patentee is precluded from reaching, under the doctrine of equivalents, subject matter that was disclaimed in order to obtain the patent.

The district court found that the Medzam envelope performs the function of releasing its contents in a substantially different way than does the envelope of the '266 patent, in that the Medzam envelope is not soluble in and does not degrade in the liquid. Although Multiform argues that the Medzam packet functions in a way that is "consistent" with the '266 invention, for the Medzam porous envelope releases its contents upon contact with liquid, the district court found a porous envelope that bursts with inner pressure to be substantially different from a degradable envelope that dissolves. This finding has not been shown to be clearly erroneous.

[15] Multiform argues that the interchangeability of the envelopes weighs heavily on the side of equivalency. Interchangeability is a significant factor in determination of equivalency. In *Warner-Jenkinson,* --- U.S. at ---- - ----, 117 S.Ct. at 1052-53, 41 USPQ2d at 1874, the Court explained that interchangeability need not be known at the time the patent application was filed, and that substitution of a later-developed element does not insulate the combination from a finding of equivalency. *See* ***1481Atlas Powder Co. v. E.I. du Pont De Nemours & Co.*,** 750 F.2d 1569, 1581, 224 USPQ 409, 417 (Fed.Cir. 1984) (separately patentable element did not avoid equivalency). However, the district court found that "the Red-Z Zafety Pac envelope would not be known as interchangeable with a degradable envelope by one reasonably skilled in the art." 1995 WL 737929 at *13. The modes of dissolving and bursting are not clearly interchangeable, and we do not discern clear error in the district court's finding that they were not interchangeable.

The district court's finding of non-infringement under the doctrine of equivalents is not clearly erroneous, and must be affirmed.

VALIDITY

[16] After the trial Medzam withdrew its antitrust, unfair competition, unfair trade practice, and tort-based counterclaims; no counterclaims remained. Although Medzam continued to assert patent invalidity as an affirmative defense to infringement, the district court stated, upon finding non-infringement, that it "need not reach the issue of whether Medzam has overcome the presumption of validity regarding the '266 Patent." 1995 WL 737929 at *14. The district court recognized that it could, in its discretion, decide this affirmative defense, but chose not to do so, citing Fed.R.Civ.P. 8(c). Medzam objects to this exercise of judicial restraint, arguing that the validity issue was fully litigated and that it is entitled to a decision, referring in its brief to its "request for a declaration of invalidity or unenforceability."

Although viewed by Medzam as a mere technicality, it is dispositive that Medzam did not file a counterclaim for a declaration of invalidity. The Supreme Court in *Cardinal Chem. Co. v. Morton Int'l, Inc.*, 508 U.S. 83, 113 S.Ct. 1967, 124

L.Ed.2d 1, 26 USPQ2d 1721 (1993) drew a dispositive distinction between an affirmative defense and a counterclaim for a declaratory judgment. The Court stated: "An unnecessary ruling on an affirmative defense is not the same as the necessary resolution of a counterclaim for a declaratory judgment." *Cardinal Chemical,* 508 U.S. at 93-94, 113 S.Ct. at 1973, 26 USPQ2d at 1726. A request for a ruling of invalidity, for example as in Medzam's motion for judgment as a matter of law filed after close of the plaintiff's case, does not convert the defense into a counterclaim; nor does the filing of a trial brief, nor the filing of proposed findings and conclusions on the issue of validity.

In *Cardinal Chemical* the Court held that the Federal Circuit, when reviewing infringement on appeal, should also review the issue of validity when that issue was raised by counterclaim or declaratory judgment and was decided by the trial court, as a matter of serving the public interest in valid patents. However, the Court suggested that appellate review was unnecessary when the issue of validity was raised only as an affirmative defense. 508 U.S. at 93-94, 113 S.Ct. at 1973-74, 26 USPQ2d at 1726. The Court did not discuss whether there should be an obligation on the trial court to decide the issue of validity, when the dispute has been finally disposed of on other grounds. We decline to require the trial court now to decide patent validity, after the controversy has been resolved.

Thus we decline Medzam's request for further proceedings on the issue of validity, even as we stress the useful general rule that trial courts should decide all litigated issues, in the interest of finality. *See Sinclair & Carroll Co. v. Interchemical Corp.,* 325 U.S. 327, 330, 65 S.Ct. 1143, 1145, 89 L.Ed. 1644, 65 USPQ 297, 299 (1945) (suggesting that it is usually the better practice for the district court to decide validity); *accord Cardinal Chemical,* 508 U.S. at 100, 113 S.Ct. at 1976-77, 26 USPQ2d at 1729 (citing *Sinclair & Carroll* with approval). We take note that if the Federal Circuit had reversed the judgment of non-infringement, the issue of validity would have required remand and decision, perhaps followed by another appeal, and accompanying cost, delay, and inefficiency. However, as this litigation has evolved, Medzam has no justiciable interest in validity. The case is over.

ATTORNEY FEES

[17] The district court's denial of attorney fees under 35 U.S.C. § 285 is subject to reversal only if (1) the finding that this is not an exceptional case is clearly erroneous and (2) the ensuing refusal of attorney fees is an abuse of discretion.

[18] Findings of exceptional case have been based on a variety of factors; for example, ***1482** willful or intentional infringement, inequitable conduct before the Patent and Trademark Office, vexatious or unjustified litigation, or other misfeasant behavior. *See Rite-Hite Corp. v. Kelley Co., Inc.,* 819 F.2d 1120, 1126, 2 USPQ2d 1915, 1919 (Fed.Cir.1987). Medzam offers three reasons why this case should be deemed exceptional. First, Medzam states that Multiform engaged in bad faith litigation because Multiform "admitted" that Medzam's product did not have a "degradable" envelope. Multiform responds that it always had the good faith belief that Medzam's product was "degradable" in terms of the '266 patent. We agree that Medzam mischaracterizes Multiform's "admission," and that bad faith can not be founded on this issue.

[19] Medzam also argues that it was an act of bad faith for Multiform to add the "means-for" claims to the '266 patent in an attempt to cover Medzam's product. However, it is neither illegal nor bad faith for an applicant to amend the claims in view of a competitor's product. *See Kingsdown Medical Consultants, Ltd. v. Hollister Inc.,* 863 F.2d 867, 874, 9 USPQ2d 1384, 1390 (Fed.Cir.1988), *cert. denied,* 490 U.S. 1067, 109 S.Ct. 2068, 104 L.Ed.2d 633 (1989) ("[N]or is it in any manner improper to amend or insert claims intended to cover a competitor's product the applicant's attorney has learned about during the prosecution of a patent application."); *State Industries, Inc. v. A.O. Smith Corp.,* 751 F.2d 1226, 1235, 224 USPQ 418, 424 (Fed.Cir.1985).

Medzam also states that Multiform committed inequitable conduct by presenting the patent examiner with misleading dictionary definitions during the prosecution of the '266 patent. Medzam states that Multiform cited the dictionary definition of "degrade," while failing to cite the dictionary

definition of "degradable," which Medzam says is inconsistent with "degrade." Medzam states that intent to deceive can be inferred from this action. Although direct evidence of fraudulent intent is not easy to come by, inference without any probative evidence is insufficient to show culpable intent. As discussed in *Kingsdown,* the charge of inequitable conduct before the patent office had come to be attached to every patent prosecution, diverting the court from genuine issues and simply spawning satellite litigation. *See Kingsdown,* 863 F.2d at 876, 9 USPQ2d at 1391; *Burlington Indus., Inc. v. Dayco Corp.,* 849 F.2d 1418, 1422, 7 USPQ2d 1158, 1161 (Fed.Cir.1988) (the charge of inequitable conduct in every major patent case "has become an absolute plague"). Medzam has not shown that the dictionary definitions were incorrect or misleading or that the examiner was misled.

The district court correctly held that "Medzam has not shown by clear and convincing evidence that Multiform's conduct before the PTO was inequitable." 1995 WL 737929 at *14. Rejecting Medzam's claim that this was an exceptional case, the court declined to award attorney fees. In *S.C. Johnson & Son v. Carter-Wallace, Inc.,* 781 F.2d 198, 201, 228 USPQ 367, 369 (Fed.Cir.1986) we explained that "[t]he trial judge is in the best position to weigh considerations such as the closeness of the case, the tactics of counsel, the conduct of the parties, and any other factors that may contribute to a fair allocation of the burdens of litigation as between winner and loser." The denial of attorney fees is affirmed.

No costs.

AFFIRMED.

133 F.3d 1473, 45 U.S.P.Q.2d 1429

Briefs and Other Related Documents (Back to top)

• 1996 WL 33417588 (Appellate Brief) Reply Brief of Cross-Appellant Multiform Desiccants, Inc. (Oct. 24, 1996) (Appellate Brief) Reply Brief of Cross-Appellant Multiform Desiccants, Inc. (Oct. 24, 1996) Original Image of this Document (PDF)

• 1996 WL 33417589 (Appellate Brief) Reply Brief for Defendant-Appellant Medzam, Ltd. (Oct. 07, 1996) (Appellate Brief) Reply Brief for Defendant-Appellant Medzam, Ltd. (Oct. 07, 1996) Original Image of this Document (PDF)

• 1996 WL 33417590 (Appellate Brief) Brief of Appellee/Cross-Appellant Multiform Desiccants, Inc. (Aug. 27, 1996) (Appellate Brief) Brief of Appellee/Cross-Appellant Multiform Desiccants, Inc. (Aug. 27, 1996) Original Image of this Document with Appendix (PDF)

• 1996 WL 33417591 (Appellate Brief) Brief for Defendant-Appellant Medzam, Ltd. (Jul. 15, 1996) (Appellate Brief) Brief for Defendant-Appellant Medzam, Ltd. (Jul. 15, 1996) Original Image of this Document with Appendix (PDF)

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174 F.3d 1308
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(Cite as: 174 F.3d 1308)

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Briefs and Other Related Documents

United States Court of Appeals, Federal Circuit.

AL-SITE CORPORATION and Magnivision, Inc., Plaintiffs-Appellants,
v.
VSI INTERNATIONAL, INC. and Myron Orlinsky, Defendants-Cross Appellants.

Nos. 97-1593, 98-1008.

March 30, 1999.
Rehearing and Suggestion for Rehearing En Banc Denied May 25, 1999.

Assignee of patents claiming hangers for displaying non-prescription eyeglasses brought action against competitor and competitor's chairman, alleging patent, trademark, and trade dress infringement. After granting assignee's motion for summary judgment on competitor's defense of inequitable conduct, 1997 WL 579201, and then conducting jury trial, the United States District Court for the Southern District of Florida, C. Clyde Atkins, Senior Judge, entered judgment upon jury verdict finding literal infringement of one patent, infringement of remaining patents under doctrine of equivalents, trademark and trade dress infringement, and unfair competition. The jury also imposed personal liability on competitor's chairman, making him jointly and severally liable for the damage award. Parties appealed. The Court of Appeals, Rader, Circuit Judge, held that: (1) one patent was literally infringed; (2) remaining patents were also infringed; (3) patents were not invalid for obviousness; (4) competitor did not infringe trade dress of assignee's display cards, color coding system, or eyeglass colors and styles; (5) competitor did not infringe assignee's "MAGNIVISION" trademark; (6) competitor did not engage in unfair competition; and (7) chairman was not personally liable for patent infringement.

Affirmed in part and reversed in part.

West Headnotes

[1] Federal Courts ⚿765
170Bk765 Most Cited Cases

Court of Appeals reviews the district court's denials of motions for judgment as a matter of law using the same standards applied by the district court and will only upset a jury verdict if the record lacks substantial evidence to support the verdict.

[2] Patents ⚿237
291k237 Most Cited Cases

Patent for hanger used to display eyeglasses, which described use of rivet or button as fastening means, was literally infringed by accused hanger which used adhesive fastening means, because adhesive was equivalent to structure disclosed in patent specification, and adhesive was "in engagement" with extension that projected from bottom edge of hanger body, as required by the patent.

[3] Federal Courts ⚿844
170Bk844 Most Cited Cases

As the finder of fact, the jury receives deference for its function of weighing witness demeanor, credibility, and meaning.

[4] Patents ⚿314(5)
291k314(5) Most Cited Cases

Court of Appeals reviews the district court's patent claim interpretation without deference.

[5] Patents ⚿101(8)
291k101(8) Most Cited Cases

If the word "means" appears in a patent claim element in combination with a function, it is presumed to be a means-plus-function element under patent statute, although, according to its express terms, means-plus-function provision governs only claim elements that do not recite sufficient structural limitations, and presumption that means-plus-function provision applies is overcome if the claim itself recites sufficient structure or material for performing the claimed function. 35 U.S.C.A. § 112.

[6] Patents ⚿101(8)
291k101(8) Most Cited Cases

Although use of the phrase "means for" or "step for" is not the only way to invoke statutory means-plus-function provision, that terminology typically invokes the provision while other formulations generally do not; therefore, when an element of a claim does not use the term "means," treatment as a means- plus-function claim element is generally not appropriate. 35 U.S.C.A. § 112.

[7] Patents ⚿101(8)
291k101(8) Most Cited Cases

When it is apparent that an element of a patent claim invokes purely functional terms, without the additional recital of specific structure or material for performing that function, the claim element may be a means-plus-function element despite the lack of express means-plus-function language. 35 U.S.C.A. § 112.

[8] Patents ⚿226.7
291k226.7 Most Cited Cases

Term "eyeglass hanger member" in patents for hangers used to display eyeglasses did not trigger application of statutory means-plus-function provision, as elements were not in traditional means-plus-function format, and claims themselves contained sufficient structural limitations for performing specified function of mounting a pair of eyeglasses. 35 U.S.C.A. § 112.

[9] Patents ⚿226.7
291k226.7 Most Cited Cases

Element of patent claim described as "attaching portion attachable to a portion of said frame of said pair of eyeglasses," in patent for hanger used to display eyeglasses, did not trigger application of statutory means-plus-function provision, as claim element was not in traditional means-plus-function form and supplied structural, not functional, terms. 35 U.S.C.A. § 112.

[10] Patents ⚿226.7
291k226.7 Most Cited Cases

Term "eyeglass contacting member" in patent for hangers used to display eyeglasses did not trigger application of statutory means-plus-function provision, as elements were not in traditional means-plus-function format, and claim recited sufficient structure for performing recited function. 35 U.S.C.A. § 112.

[11] Patents ⚿237
291k237 Most Cited Cases

Jury's finding that structure of accused eyeglass hanger was equivalent to "means for securing" element of claimed eyeglass hanger under the doctrine of equivalents supported inference that jury considered accused structure to be "equivalent" of claimed hanger, for purpose of determining literal infringement under means-plus-function analysis, so any error in district court's claim construction and resulting instruction that led to finding of infringement under doctrine of equivalents, rather than finding of literal infringement, was harmless.

[12] Patents ⚿237
291k237 Most Cited Cases

An "equivalent" under patent statute's means-plus-function provision informs the claim meaning for a literal infringement analysis, by restricting the scope of a functional claim limitation, while the "doctrine of equivalents" extends enforcement of claim terms beyond their literal reach in the event there is equivalence between the elements of the accused product or process and the claimed elements of the patented invention. 35 U.S.C.A. § 112.

[13] Patents ⚿237
291k237 Most Cited Cases

An equivalent structure or act under patent statute's means-plus-function provision cannot embrace technology developed after the issuance of the patent because the literal meaning of a claim is fixed upon its issuance; an "after arising equivalent" infringes, if at all, under the doctrine of equivalents, and an after-arising technology could infringe under the doctrine of equivalents without infringing literally as a mean-plus-function equivalent. 35 U.S.C.A. § 112.

[14] Patents ⚿237
291k237 Most Cited Cases

Under patent statute's means-plus-function provision, an accused device must perform the identical function as recited in the claim element,

while the doctrine of equivalents may be satisfied when the function performed by the accused device is only substantially the same. 35 U.S.C.A. § 112.

[15] Patents ⚿237
291k237 Most Cited Cases

Where there is identity of function and no after-arising technology, a means- plus-function element of a patent claim that is found to be infringed only under the doctrine of equivalents due to a jury instruction failing to instruct on structural equivalents for means-plus-function purposes is also literally present in the accused device. 35 U.S.C.A. § 112.

[16] Patents ⚿169
291k169 Most Cited Cases

District court's construction of "opening means" element in patent for eyeglass hanger to mean the elongated slot having a notch as described and depicted in the patent, and the structural equivalents thereof, was not barred by prior Court of Appeals opinion construing separate patent assigned to same patentee; claims had different language and different meanings, Court of Appeals opinion was nonprecedential, and record did not indicate that Court had rejected construction at issue or that alleged infringer should be denied the opportunity to seek a narrower construction.

[17] Patents ⚿168(2.1)
291k168(2.1) Most Cited Cases

Prosecution history related to one patent did not give rise to estoppel in connection with later patents that arose from related applications, where specific limitation added in claims of earlier issued patent was not present in claims of later issued patents.

[18] Patents ⚿314(5)
291k314(5) Most Cited Cases

Although the determination of whether a patent is obvious is ultimately a legal conclusion, it rests on underlying factual determinations. 35 U.S.C.A. § 103.

[19] Patents ⚿312(1.2)
291k312(1.2) Most Cited Cases

Issued patents have a strong presumption of validity in infringement proceedings, and, hence, an accused infringer who defends on grounds of patent invalidity bears the burden of showing patent invalidity by clear and convincing evidence. 35 U.S.C.A. § 282.

[20] Patents ⚿16.5(1)
291k16.5(1) Most Cited Cases

[20] Patents ⚿36(2)
291k36(2) Most Cited Cases

In a challenge to a patent based on obviousness, the person alleging invalidity must show prior art references which alone or combined with other references would have rendered the invention obvious to one of ordinary skill in the art at the time of invention, and, because the presumption of validity carries with it a presumption that the patent examiner did his duty and knew what claims he was allowing, the challenger's burden is especially difficult when the prior art was before the examiner during prosecution of the application. 35 U.S.C.A. §§ 103, 282.

[21] Patents ⚿16(2)
291k16(2) Most Cited Cases

Party seeking patent invalidity based on obviousness must show some motivation or suggestion to combine the prior art teachings, which generally arises in the references themselves, but may also be inferred from the nature of the problem or occasionally from the knowledge of those of ordinary skill in the art. 35 U.S.C.A. § 103.

[22] Patents ⚿16.18
291k16.18 Most Cited Cases

Patents for hangers used to display non-prescription eyeglasses were not invalid for obviousness, as there was no evidence of specific teaching or suggestion for combining prior art in such manner as to result in hanger with all elements of claimed hangers, evidence supported finding that one of ordinary skill in the art would not have known to make such combination, and secondary considerations supported finding of nonobviousness. 35 U.S.C.A. § 103.

[23] Patents ⚿16(3)

291k16(3) Most Cited Cases

The level of skill in the art is a prism or lens through which a judge or jury views the prior art and the claimed invention, for purpose of claim that patent is obvious; this reference point prevents these deciders from using their own insight or, worse yet, hindsight, to gauge obviousness. 35 U.S.C.A. § 103.

[24] Courts ⚿96(7)
106k96(7) Most Cited Cases

For areas of law, such as trademark and trade dress infringement, which are not unique to jurisdiction of the Court of Appeals for the Federal Circuit, that Court applies the law of the pertinent regional circuit.

[25] Trade Regulation ⚿704
382k704 Most Cited Cases

[25] Trade Regulation ⚿725
382k725 Most Cited Cases

A finding of trademark and trade dress infringement is a question of fact, so a jury verdict of trademark or trade dress infringement is therefore reviewed for substantial evidence, although legal determinations of the district court receive no deference on review.

[26] Trade Regulation ⚿43
382k43 Most Cited Cases

Trade dress protection embraces the total image of the product including such factors as the size, shape, and color of the product's packaging and appearance.

[27] Trade Regulation ⚿43
382k43 Most Cited Cases

[27] Trade Regulation ⚿349
382k349 Most Cited Cases

To prove trade dress infringement, the plaintiff must show: (1) the inherent distinctiveness or secondary meaning of its trade dress, (2) the essential nonfunctionality of its trade dress, and (3) the likelihood of consumer confusion as to origin, sponsorship, or approval due to similarity between its and the defendant's trade dress.

[28] Trade Regulation ⚿43
382k43 Most Cited Cases

"Distinctive" trade dress enables consumers to distinguish a product from others and identify that product with its source.

[29] Trade Regulation ⚿43
382k43 Most Cited Cases

Distinctiveness of trade dress is based on whether it is a common basic shape or design, whether it is unique or unusual in a particular field, and whether it is a mere refinement of a commonly adopted and well-known form of ornamentation for a particular class of goods viewed by the public as a dress or ornamentation for the goods.

[30] Trade Regulation ⚿43
382k43 Most Cited Cases

Trade dress can satisfy distinctiveness requirement by showing "secondary meaning," or a connection in the consumer's mind between the mark and the product's producer, whether that producer is known or unknown.

[31] Trade Regulation ⚿43
382k43 Most Cited Cases

Plaintiff may show secondary meaning of trade dress with consumer surveys and with evidence of lengthy and uniform display of the dress or with evidence of the plaintiff's efforts, usually through advertising, to establish in the minds of the consumers a connection between the trade dress and its product; the plaintiff may also use other evidence showing consumers' association of the trade dress with the plaintiff or its product to prove secondary meaning.

[32] Trade Regulation ⚿43
382k43 Most Cited Cases

A trade dress is "functional" if it is essential to the use or purpose of the article or if it affects the cost or quality of the article, such that its protection would place a competitor at a significant disadvantage.

[33] Trade Regulation ⚿349
382k349 Most Cited Cases

Determining whether a likelihood of confusion exists as result of alleged trade dress infringement requires weighing several factors: (1) the nature of the plaintiff's mark, (2) the similarity of the marks, (3) the similarity of the products the marks represent, (4) the similarity of the parties' retail outlets and customers, (5) the similarity of the parties' advertising, (6) the defendant's intent to copy or imitate the plaintiff's mark, and (7) the extent of actual confusion.

[34] Trade Regulation ⚿43
382k43 Most Cited Cases

Trade dress of plaintiff's display card and blister pack used to market hand- held magnifiers was not entitled to protection absent evidence of distinctiveness or secondary meaning or evidence to show likelihood of consumer confusion, regardless of whether plaintiff was sole user of its design.

[35] Trade Regulation ⚿478
382k478 Most Cited Cases

Sole use of a design is a preliminary step for a descriptive trade dress to acquire distinctiveness and secondary meaning.

[36] Trade Regulation ⚿43
382k43 Most Cited Cases

Color coding system used by maker of display hangers for nonprescription eyeglasses, by which eyeglasses of particular power would feature same color of stripe on hanger tag, was not entitled to trade dress protection, as there was no evidence of distinctiveness or secondary meaning, and system was primarily functional.

[37] Trade Regulation ⚿43
382k43 Most Cited Cases

Color itself is not inherently distinctive, for purpose of trade dress protection.

[38] Trade Regulation ⚿43
382k43 Most Cited Cases

Absent a specifically defined, color-definite, and stable visual appearance, an alleged trade dress cannot receive protection.

[39] Trade Regulation ⚿43
382k43 Most Cited Cases

Colors and styles of six of manufacturer's eyeglasses were not entitled to trade dress protection, as there was no evidence that colors and styles were inherently distinctive or possessed secondary meaning, in view of their public availability, and manufacturer changed its styles to suit demand.

[40] Trade Regulation ⚿334.1
382k334.1 Most Cited Cases

To prove trademark infringement, a trademark owner must show a likelihood that consumers would confuse the defendant's mark with the protected mark.

[41] Trade Regulation ⚿334.1
382k334.1 Most Cited Cases

Factors which contribute to a likelihood of confusion finding, in a trademark infringement action, include (1) the nature of the plaintiff's mark, (2) the similarity of the marks, (3) the similarity of the products represented by the marks, (4) the similarity of the retail outlets and consumers, (5) the nature and extent of the parties' advertising, (6) the defendant's intent to copy the plaintiff's mark, and (7) the extent of actual confusion; other relevant factors include the strength of the marks, the number and nature of similar marks in use on similar goods, the nature and extent of any actual confusion and the length of time during and conditions under which there has been concurrent use without evidence of actual confusion.

[42] Trade Regulation ⚿356
382k356 Most Cited Cases

Competitor's use of mark "MAGNA•DOT" did not infringe assignee's "MAGNIVISION" trademark for nonprescription eyeglasses, as marks did not present a similar sound, meaning, or commercial impression, there was evidence that MAGNA/MAGNI prefix and VISION suffix enjoyed wide use in the eyeglass industry on similar goods and services, and there was no evidence of actual confusion despite several years of simultaneous use in an identical market.

[43] Trade Regulation ⚿584.1
382k584.1 Most Cited Cases

Finding of unfair competition lacked substantial evidence, where only evidence of unfair competition came from claims of trademark and trade dress infringement, and, as matter of law, there was no trademark or trade dress infringement.

[44] Trade Regulation ⚿461
382k461 Most Cited Cases

Unfair competition provides an additional degree of protection above that provided by trademark and trade dress law; although trademark and trade dress infringement may be the basis for a claim of unfair competition, it frequently requires the court to examine additional conduct that would not give rise to a claim of trademark infringement.

[45] Corporations ⚿1.6(1)
101k1.6(1) Most Cited Cases

[45] Corporations ⚿1.7(2)
101k1.7(2) Most Cited Cases

Personal liability of officer for corporation's acts of patent infringement requires sufficient evidence to justify piercing the corporate veil; the corporate entity deserves respect and legal recognition unless specific, unusual circumstances justify disregarding the corporate structure. 35 U.S.C.A. § 271(a).

[46] Corporations ⚿1.6(1)
101k1.6(1) Most Cited Cases

Corporate officer's act of making sole decision to continue using accused hanger tags after corporation received cease and desist letters from patent assignee was not sufficient to impose personal liability on officer for patent infringement; officer acted within and according to strictures of corporate structure, record showed no instance of the corporation operating as officer's alter ego, and officer acted upon advice of counsel. 35 U.S.C.A. § 271(a).

Patents ⚿328(2)
291k328(2) Most Cited Cases

3,116,529, 3,291,300, 3,710,996, 3,738,034. Cited as prior art.

Patents ⚿328(2)
291k328(2) Most Cited Cases

4,976,532, 5,144,345, 5,260,726, 5,521,911. Valid and infringed.

Patents ⚿328(2)
291k328(2) Most Cited Cases

5,141,104. Cited.

Trade Regulation ⚿736
382k736 Most Cited Cases

MAGNIVISION.
***1313** Peter T. Cobrin, Cobrin, Gittes & Samuel, of New York City, argued for plaintiffs-appellants. With him on the brief was ***1314** Stephen E. Nagin, Nagin, Gallop & Figueredo, P.A., of Miami, Florida, of counsel was Oren J. Warshavsky.

Donald W. Rupert, Mayer, Brown & Platt, of Chicago, Illinois, argued for defendants-cross appellants. With him on the brief were Robert S. Rigg and Lisa A. Schneider, of counsel on the brief were Richard L. Horn and Heather A. Libbey, Wilson & McIlvaine, of Chicago, Illinois, of counsel was Myles G. Cypen, Cypen & Cypen, of Miami, Florida.

Before: MAYER, Chief Judge, RICH, and RADER , Circuit Judges.

RADER, Circuit Judge.

This case involves patent, trademark, and trade dress infringement. After the United States District Court for the Southern District of Florida interpreted the claims, a jury found that VSI International, Inc. (VSI) had infringed several patents claiming specific hangers for displaying non- prescription eyeglasses. The jury also found trademark and trade dress infringement, and unfair competition. In addition, the jury found VSI's chairman and CEO, Myron Orlinsky, personally liable for these violations. Although Al-Site Corporation, now Magnivision, Inc. (Magnivision) [FN1], prevailed on infringement, it appeals the district court's claim construction. On review, this

court discerns errors in claim construction. Under a correct claim construction, the record contains substantial evidence that VSI infringed Magnivision's patents. Therefore, this court affirms the patent infringement finding. The record, however, does not contain substantial evidence to support the jury's findings of trademark and trade dress infringement, unfair competition, or personal liability for Myron Orlinsky. Therefore, this court reverses those judgments.

FN1. After this litigation began, American Greetings Corporation acquired Al-Site Corporation, the named plaintiff in this case, and merged it with Magni-Tech Corporation to form Magnivision, Inc. The parties and this court, therefore, refer to the plaintiff as Magnivision.

I.

Magnivision and VSI both sell non-prescription eyeglasses. Magnivision is the assignee of U.S. Patent Nos. 4,976,532 (the '532 patent), 5,144,345 (the '345 patent), 5,260,726 (the '726 patent), and 5,521,911 (the '911 patent). These patents claim technology for displaying eyeglasses on racks. The claimed inventions allow consumers to try on eyeglasses and return them to the rack without removing them from their display hangers.

Magnivision sued VSI, as well as its chairman and CEO, Myron Orlinsky, in his individual capacity, for infringement of the Magnivision patents, for infringement of Magnivision's MAGNIVISION trademark and the trade dress of various products, and for unfair competition under Florida law. Six years after filing, the district court conducted a jury trial. After interpreting the claims, the district court instructed the jury to apply its construction of the claims to determine infringement.

The jury determined that one of VSI's products (the Version 1 hanger tag) literally infringed the '532 patent. The jury also determined that a second VSI product (the Version 2 hanger tag) did not literally infringe the ' 345, '726, and '911 patents, but did infringe those patents under the doctrine of equivalents. The jury further concluded that the Magnivision patents were not invalid under 35 U.S.C. § 103. Additionally, the jury found that VSI had infringed Magnivision's trademark and trade dress and had engaged in unfair competition. Finally, the jury imposed personal liability on Myron Orlinsky, making him jointly and severally liable for the damage award.

Following the jury verdict, Magnivision moved for judgment as a matter of law that the Version 2 hanger tag literally infringed the '345, '726, and '911 patents. VSI's post-trial motion sought to reverse all of the jury's determinations. The district ***1315** court denied both motions and both parties appeal. Specifically, Magnivision challenges the district court's claim construction of the '345, '726, and '911 patents, arguing that the claims, if properly construed, would have been literally infringed by VSI's Version 2 hanger tag. VSI, on the other hand, contends that the district court's claim construction was correct but challenges the jury's determinations for lack of substantial evidence to support a verdict.

II.

[1] This court reviews the district court's denials of the motions for judgment as a matter of law using the same standards applied by the district court. *See Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 975, 34 USPQ2d 1321, 1326 (Fed.Cir.1995), *aff'd*, 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577, 38 USPQ2d 1461 (1996). This court will only upset a jury verdict if the record lacks substantial evidence to support the verdict. *See Motorola, Inc. v. Interdigital Tech. Corp.*, 121 F.3d 1461, 1466, 43 USPQ2d 1481, 1484 (Fed.Cir.1997); *Markman*, 52 F.3d at 975.

Literal Infringement of the '532 patent

The jury determined that the Version 1 hanger tag literally infringes claims 8, 9, 14, 15, and 17 of the '532 patent. Claim 8, the independent claim from which the other infringed claims depend, claims the combination of a pair of eyeglasses and a hanger means for removably mounting the eyeglasses on a cantilevered support. The claim itself gives some structural definition of the hanger means as "including a body having aperture means adapted" for suspending the hanger and eyeglasses on the cantilevered support. Additionally, the hanger means includes an extension projecting from the bottom edge portion of the hanger body. This

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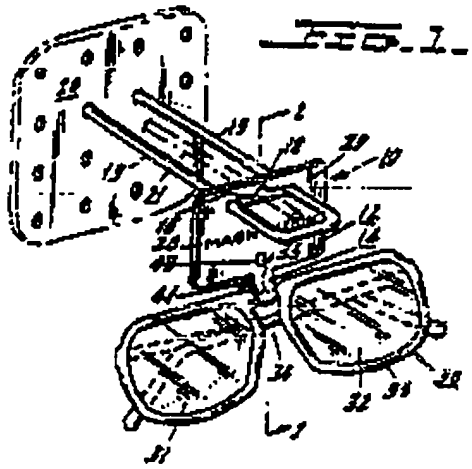
extension encircles the nose bridge of the eyeglasses. The claim specifies that "fastening means in engagement with said extension" hold the extension in a closed loop. Figure 1 from the ' 532 patent illustrates these claimed features:

FIG. 1.



The district court determined that the "fastening means" was a means-plus- function element subject to the interpretation requirements of 35 U.S.C. § 112, ¶ 6 (1994). Consistent with that determination, the trial court instructed the jury that "the fastening means ... is either a rivet or a button and hole arrangement as shown in the '532 patent or the structural equivalents thereof." Neither party challenges this part of the district court's claim construction.

***1316** [2] On appeal, VSI contends that its Version 1 hanger tag does not infringe because it does not include the "fastening means" required by claim 8. VSI's Version 1 hanger tag is a one-piece paper sticker having two large portions connected by a narrow extension. The entire back of the tag, including the extension, is coated with an adhesive. Backing paper covers the adhesive to prevent undesired adhesion. In use, a merchant removes the backing paper from the large portions of the tag. The extension (still covered with backing paper) then wraps around the nose bridge of the glasses. This wrapping glues the large portions together. In use, therefore, glue secures the two large portions of the tag to each other, leaving the narrow extension of the tag wrapped around the bridge of the eyeglasses.

The adhesive used by VSI is not identical to the fastening structure (namely, a rivet or button) described in the '532 patent. The jury, however, applying the rules of § 112, ¶ 6, determined that the VSI adhesive was equivalent to the structure disclosed in the specification. Accordingly, the jury returned a verdict of literal infringement of the '532 patent. VSI argues that substantial evidence does not support the jury's finding of literal infringement.

VSI first challenges the jury determination that adhesive is structurally equivalent to the mechanical fasteners disclosed in the specification of the '532 patent. Magnivision's technical expert, Mr. Anders, testified that, for one of ordinary skill in the art, it would be an insubstantial change "to substitute a rivet for a staple or for glue or for any other method that's standard in the [point of purchase] industry to maintain this loop as a closed loop." *See Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc.,* 145 F.3d 1303, 1309, 46 USPQ2d 1752, 1756-57 (Fed.Cir.1998) ("The proper test [for determining equivalence under § 112, ¶ 6] is whether the differences between the structure in the accused device and any disclosed in the specification are insubstantial.... The question of known interchangeability is ... an important factor in determining equivalence [under § 112, ¶ 6]."). Mr. Anders further testified that the use of glue "in between the two layers of the body ... is an insubstantial change from the other structure ... which was one of a rivet. People in point of purchase displays use glue or rivets or staples to accomplish the same function." *But see Chiuminatta,* 145 F.3d at 1309 ("Almost by definition, two structures that perform the same function may be substituted for one another. The question of known interchangeability is not whether both structures serve the same function, but whether it was known that one structure was an equivalent of another."). Mr. Anders additionally testified that "equivalent fastening means could be a rivet, glue or staple or some such similar [structure]." This testimony constitutes sufficient evidence to sustain the jury's verdict that persons of ordinary skill in the art consider glue an equivalent structure to those disclosed in the specification for maintaining a closed loop.

As a fallback position, VSI argues that, even if the glue is an equivalent of the rivet or button,

Magnivision presented no evidence that the glue was "in engagement" with the extension as claim 8 requires. On cross examination, Mr. Anders identified the middle section of the Version 1 hanger tag as the "extension" element. Mr. Anders also identified the glue as the "fastening means" element. Because VSI leaves the backing paper on its extension (presumably to prevent the tag from adhering to the eyeglasses), VSI argues that its extension does not engage the fastening means as required by the claims of the '532 patent.

VSI's argument is unpersuasive. The claims of the '532 patent only require that the fastening means be "in engagement with" the extension. As noted above, VSI coats the extension of its Version 1 hanger tag with glue--the fastening means identified by Mr. Anders. Furthermore, Mr. Anders' testimony explains that the extension and the glued portions are one integral piece. The jury could have interpreted ***1317** his testimony to mean that the extension includes more than the narrow, middle portion of the Version 1 tag. Under this interpretation, the extension would also directly engage the glue fastening means. Alternatively, the jury could have determined that the extension is only the narrow portion of the Version 1 tag, but that the fastening means includes one of the two portions of the tag body in addition to the glue. Under any of these reasonable views of the accused product, the extension of the Version 1 hanger tag is in engagement with the glue fastening means as required by the claims.

[3] As the finder of fact, the jury receives deference for its function of weighing witness demeanor, credibility, and meaning. *See Anderson v. City of Bessemer City, North Carolina,* 470 U.S. 564, 575, 105 S.Ct. 1504, 84 L.Ed.2d 518 (1985) (factfinder entitled to deference on credibility determinations). Substantial evidence therefore supports the jury's verdict that VSI's Version 1 hanger tag literally infringes the '532 patent.

Infringement of the '345, '726, and '911 Patents

The jury determined that VSI's Version 2 hanger tag and display rack did not literally infringe claims 1 and 2 of the '345 patent; claims 1 and 2 of the '726 patent; or claims 1, 2, and 3 of the '911 patent. The jury nevertheless found infringement of each of these claims under the doctrine of equivalents. Magnivision argues that the district court misconstrued these claims, and that, under the proper claim construction, VSI's products literally infringe these claims as a matter of law. VSI, on the other hand, embraces the district court's claim construction and argues that prosecution history estoppel precludes a finding of infringement under the doctrine of equivalents.

Claim 1 of the '345 patent and claim 1 of the '726 patent are similar. Both claim "[t]he combination of an eyeglass display member and an eyeglass hanger member." In each of these claims, this combination includes a "display member" with "cantilever support means" and "an eyeglass hanger member for mounting a pair of eyeglasses." Both claims further define the structure of the eyeglass hanger member. Claim 1 of the '345 patent describes the eyeglass hanger member as "made from flat sheet material," and having an "opening means formed ... below [its] upper edge." According to claim 1 of the '726 patent, the eyeglass hanger member has "an attaching portion attachable to a portion of said frame of said pair of eyeglasses to enable the temples of the frame [to be opened and closed]." Similarly, claim 2 of the '726 patent encompasses a "method of displaying eyeglass/hanger combinations ... the eyeglass hangers having an attaching portion attached to a portion of the frame of an associated pair of eyeglasses."

Claims 1, 2, and 3 of the '911 patent encompass a "combination of an eyeglass display member and an eyeglass contacting member." The '911 patent further describes the structure of the "eyeglass contacting member" as "having an encircling portion adapted to encircle a part of said frame of said pair of eyeglasses."

The district court construed the "eyeglass hanger member" element of the '345 patent as a means-plus-function claim element subject to § 112, ¶ 6. Accordingly, the district court instructed the jury that "[t]he 'eyeglass hanger member for mounting a pair of eyeglasses' [in claim 1 of the '345 patent] is the body of the hanger disclosed in the '345 patent and its drawings and the structural equivalents thereof." The district court similarly interpreted the "eyeglass hanger member" element of the '726 patent. The district court instructed the jury that "[t]he 'eyeglass hanger member for

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mounting a pair of eyeglasses' [in claim 1 of the '726 patent] is the hanger disclosed in the '726 patent and its drawings as having a body, an aperture, and an attaching portion and the structural equivalents thereof."

***1318** With respect to the '911 patent, the district court concluded that the "eyeglass contacting member" was a means-plus-function element. The district court therefore instructed the jury that the "eyeglass contacting member" is "the hanger disclosed in the '911 patent and its drawings having a body and an aperture and an 'encircling portion', and the structural equivalents thereof."

[4][5] This court reviews the district court's claim interpretation without deference. *See Cybor Corp. v. FAS Technologies, Inc.,* 138 F.3d 1448, 1454-56, 46 USPQ2d 1169, 1172-75 (Fed.Cir.1998) (en banc); *Markman,* 52 F.3d at 979-81. This court has delineated several rules for claim drafters to invoke the strictures of 35 U.S.C. § 112, ¶ 6. Specifically, if the word "means" appears in a claim element in combination with a function, it is presumed to be a means-plus-function element to which § 112, ¶ 6 applies. *See Sage Prods., Inc. v. Devon Indus., Inc.,* 126 F.3d 1420, 1427, 44 USPQ2d 1103, 1109 (Fed.Cir.1997); *Greenberg v. Ethicon Endo-Surgery, Inc.,* 91 F.3d 1580, 1583, 39 USPQ2d 1783, 1785 (Fed.Cir.1996). Nevertheless, according to its express terms, § 112, ¶ 6 governs only claim elements that do not recite sufficient structural limitations. *See* 35 U.S.C. § 112, ¶ 6. Therefore, the presumption that § 112, ¶ 6 applies is overcome if the claim itself recites sufficient structure or material for performing the claimed function. *See Sage,* 126 F.3d at 1427-28 ("[W]here a claim recites a function, but then goes on to elaborate sufficient structure, material, or acts within the claim itself to perform entirely the recited function, the claim is not in means- plus-function format."); *York Prods., Inc. v. Central Tractor Farm & Family Ctr.,* 99 F.3d 1568, 1574, 40 USPQ2d 1619, 1623 (Fed.Cir.1996); *Cole v. Kimberly-Clark Corp.,* 102 F.3d 524, 531, 41 USPQ2d 1001, 1006 (Fed.Cir.1996).

[6][7] Although use of the phrase "means for" (or "step for") is not the only way to invoke § 112, ¶ 6, that terminology typically invokes § 112, ¶ 6 while other formulations generally do not. *See Greenberg,* 91 F.3d at 1583-84. Therefore, when an element of a claim does not use the term "means," treatment as a means-plus-function claim element is generally not appropriate. *See Mas-Hamilton Group v. LaGard, Inc.,* 156 F.3d 1206, 1213- 15, 48 USPQ2d 1010, 1016-18 (Fed.Cir.1998). However, when it is apparent that the element invokes purely functional terms, without the additional recital of specific structure or material for performing that function, the claim element may be a means-plus-function element despite the lack of express means-plus- function language. *See, e.g., Cole,* 102 F.3d at 531 ("[M]erely because an element does not include the word 'means' does not automatically prevent that element from being construed as a means-plus-function element."); *Mas- Hamilton,* 156 F.3d at 1213-15 (interpreting "lever moving element" and "movable link member" under § 112, ¶ 6).

[8] Under this established analytical framework, the "eyeglass hanger member" elements in the claims of both the '345 and the '726 patents do not invoke § 112, ¶ 6. In the first place, these elements are not in traditional means-plus-function format. The word "means" does not appear within these elements. Moreover, although these claim elements include a function, namely, "mounting a pair of eyeglasses," the claims themselves contain sufficient structural limitations for performing those functions. As noted above, claim 1 of the '345 patent describes the eyeglass hanger member as "made from flat sheet material" with an "opening means formed ... below [its] upper edge." This structure removes this claim from the purview of § 112, ¶ 6. Similarly, according to claim 1 of the '726 patent, the eyeglass hanger member has "an attaching portion attachable to a portion of said frame of said pair of eyeglasses to enable the temples of the frame [to be opened and closed]." This structure also precludes treatment as a means-plus-function claim element. The district court ***1319** therefore improperly restricted the "eyeglass hanger member" in these claims to the structural embodiments in the specification and their equivalents.

[9] The district court also erred in interpreting the "attaching portion attachable to a portion of said frame of said pair of eyeglasses" element of claim 1 of the '726 patent as a means-plus-function element. It instructed the jury that the "attachable portion"

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is "a mechanically fastened loop that goes around the nose bridge of the glasses as disclosed in the specification, or the structural equivalent thereof." Because this claim element is also not in traditional means-plus-function form and supplies structural, not functional, terms, the trial court erred by applying § 112, ¶ 6 to this claim element. This error caused the district court to incorporate unduly restrictive structural limitations into the claim.

[10] For reasons similar to those discussed above with respect to the claim elements of the '345 and the '726 patents, the "eyeglass contacting member" element of the '911 patent claims is also not a means-plus-function element. Again, this claim element is not in traditional means-plus-function form. Furthermore, the claim itself recites sufficient structure for performing the recited function. Specifically, claim 1 of the '911 patent describes the "eyeglass contacting member" as "having an encircling portion adapted to encircle a part of said frame of said pair of eyeglasses to enable the temples of the frame to be selectively [opened and closed]." Similarly, claim 3 of the '911 patent describes the "eyeglass contacting member" as "having an attaching portion attachable to a portion of said frame of said eyeglasses." Therefore, the district court erred by applying § 112, ¶ 6 to these claim elements.

[11] Magnivision also complains that the district court erred in its construction of the language "means for securing a portion of said frame of said eyeglasses to said hanger member" in claim 1 of the '345 patent. With respect to this element, the district court instructed the jury that "[t]he 'means for securing' limitation is a mechanically fastened loop that goes around the nose bridge of the glasses ... or an equivalent thereof." The district court went on, however, to instruct the jury that "[t]he means for securing can be formed from a separate extension or integral extension and includes either the rivet fastener or the button and hole fastener." Magnivision argues that the district court should have included the phrase "or equivalents thereof" after "button and hole fastener" in its instruction to the jury. Absent this and the other claimed errors in the district court's interpretation of claim 1 of the '345 patent, Magnivision argues that the jury would have found literal infringement rather than infringement under the doctrine of equivalents.

The "means for securing" claim element is in conventional means-plus- function format without specific recital of structure and therefore invokes § 112, ¶ 6. The jury's finding of infringement of claim 1 of the '345 patent under the doctrine of equivalents indicates that the jury found every element of the claim literally or equivalently present in the accused device. The question before this court, therefore, is whether the jury's finding that the accused structure was equivalent to the "means for securing" element under the doctrine of equivalents, also indicates that it is equivalent structure under § 112, ¶ 6.

This court has on several occasions explicated the distinctions between the term "equivalents" found in § 112, ¶ 6 and the doctrine of equivalents. *See, e.g., Valmont Indus., Inc. v. Reinke Mfg. Co.,* 983 F.2d 1039, 1042-44, 25 USPQ2d 1451, 1453-56 (Fed.Cir.1993); *Chiuminatta,* 145 F.3d at 1310; *Alpex Computer Corp. v. Nintendo Co.,* 102 F.3d 1214, 1222, 40 USPQ2d 1667, 1673-74 (Fed.Cir.1996); *Dawn Equipment Co. v. Kentucky Farms Inc.,* 140 F.3d 1009, 1018-23, 46 USPQ2d 1109, 1115-18 (Fed.Cir.1998) (Plager, J., additional views) (Newman, J., additional views) (Michel, J., additional views). Indeed, the ***1320** Supreme Court recently acknowledged distinctions between equivalents as used in § 112, ¶ 6 and the doctrine of equivalents. *See Warner-Jenkinson Co. v. Hilton Davis Chem. Co.,* 520 U.S. 17, 27, 117 S.Ct. 1040, 1048, 137 L.Ed.2d 146, 41 USPQ2d 1865, 1870-71 (1997) ("[Equivalents under § 112, ¶ 6] is an application of the doctrine of equivalents in a restrictive role, narrowing the application of broad literal claim elements. [Section 112, ¶ 6] was enacted as a targeted cure to a specific problem.... The added provision, however, is silent on the doctrine of equivalents as applied where there is no literal infringement.")

[12] Section 112, ¶ 6 recites a mandatory procedure for interpreting the meaning of a means- or step-plus-function claim element. These claim limitations "shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." 35 U.S.C. § 112, ¶ 6. Thus, § 112, ¶ 6 procedures restrict a functional claim element's "broad literal language ... to those means that are 'equivalent' to the actual means shown in the patent specification." *Warner-Jenkinson,* 117 S.Ct. at 1048. Section 112,

¶ 6 restricts the scope of a functional claim limitation as part of a literal infringement analysis. *See Pennwalt Corp. v. Durand-Wayland, Inc.,* 833 F.2d 931, 934, 4 USPQ2d 1737, 1739 (Fed.Cir.1987). Thus, an equivalent under § 112, ¶ 6 informs the claim meaning for a literal infringement analysis. The doctrine of equivalents, on the other hand, extends enforcement of claim terms beyond their literal reach in the event "there is 'equivalence' between the elements of the accused product or process and the claimed elements of the patented invention." *Warner-Jenkinson,* 117 S.Ct. at 1045.

[13][14] One important difference between § 112, ¶ 6 and the doctrine of equivalents involves the timing of the separate analyses for an "insubstantial change." As this court has recently clarified, a structural equivalent under § 112 must have been available at the time of the issuance of the claim. *See Chiuminatta,* 145 F.3d at 1310. An equivalent structure or act under § 112 cannot embrace technology developed after the issuance of the patent because the literal meaning of a claim is fixed upon its issuance. An "after arising equivalent" infringes, if at all, under the doctrine of equivalents. *See Warner-Jenkinson,* 117 S.Ct. at 1052; *Hughes Aircraft Co. v. U.S.,* 140 F.3d 1470, 1475, 46 USPQ2d 1285, 1289 (Fed.Cir.1998). Thus, the temporal difference between patent issuance and infringement distinguish an equivalent under § 112 from an equivalent under the doctrine of equivalents. *See Chiuminatta,* 145 F.3d at 1310. In other words, an equivalent structure or act under § 112 for literal infringement must have been available at the time of patent issuance while an equivalent under the doctrine of equivalents may arise after patent issuance and before the time of infringement. *See Warner-Jenkinson,* 117 S.Ct. at 1053. An "after- arising" technology could thus infringe under the doctrine of equivalents without infringing literally as a § 112, ¶ 6 equivalent. [FN2] Furthermore, under § 112, ¶ 6, the accused device must perform the identical function as recited in the claim element ***1321** while the doctrine of equivalents may be satisfied when the function performed by the accused device is only substantially the same. *See Cybor,* 138 F.3d at 1456; *Hughes Aircraft,* 140 F.3d at 1475.

FN2. These principles, as explained in *Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc.,* 145 F.3d 1303, 46 USPQ2d 1752 (Fed.Cir.1998), suggest that title 35 will not produce an "equivalent of an equivalent" by applying both § 112, ¶ 6 and the doctrine of equivalents to the structure of a given claim element. A proposed equivalent must have arisen at a definite period in time, i.e., either before or after patent issuance. If before, a § 112, ¶ 6 structural equivalents analysis applies and any analysis for equivalent structure under the doctrine of equivalents collapses into the § 112, ¶ 6 analysis. If after, a non-textual infringement analysis proceeds under the doctrine of equivalents. Patent policy supports application of the doctrine of equivalents to a claim element expressed in means-plus-function form in the case of "after-arising" technology because a patent draftsman has no way to anticipate and account for later developed substitutes for a claim element. Therefore, the doctrine of equivalents appropriately allows marginally broader coverage than § 112, ¶ 6.

[15] Although § 112, ¶ 6 and the doctrine of equivalents are different in purpose and administration, "a finding of a lack of literal infringement for lack of equivalent structure under a means-plus-function limitation may preclude a finding of equivalence under the doctrine of equivalents." *Chiuminatta,* 145 F.3d at 1311. Both equivalence analyses, after all, apply "similar analyses of insubstantiality of the differences." *Id.* This confluence occurs because infringement requires, either literally or under the doctrine of equivalents, that the accused product or process incorporate each limitation of the claimed invention. *See Warner-Jenkinson,* 117 S.Ct. at 1049; *Pennwalt,* 833 F.2d at 935. Therefore, if an accused product or process performs the identical function and yet avoids literal infringement for lack of a § 112, ¶ 6 structural equivalent, it may well fail to infringe the same functional element under the doctrine of equivalents. *See Chiuminatta,* 145 F.3d at 1311. This same reasoning may be applied in reverse in certain circumstances. Where, as here, there is identity of function and no after-arising technology, a means-plus-function

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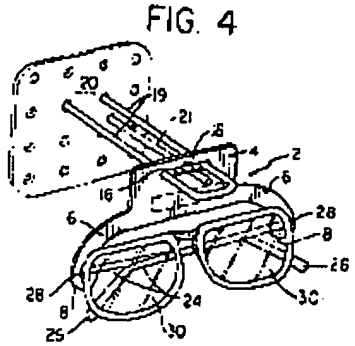
claim element that is found to be infringed only under the doctrine of equivalents due to a jury instruction failing to instruct on § 112, ¶ 6 structural equivalents is also literally present in the accused device.

VSI's Version 2 hanger tag has a central body and two arms, with one arm extending from each side of the body. Each arm has a hole near the end for receipt of an eyeglasses temple. The body also has an aperture through which a cantilever rod can be placed so the hanger tag can be hung from a display rack. VSI's Version 2 hanger tag is the subject of U.S. Patent No. 5,141,104 (the '104 patent). Figure 4 of the '104 patent illustrates these features.

FIG. 4.



As noted above, the doctrine of equivalents and structural equivalents under § 112, ¶ 6, though different in purpose and administration, can at times render the same result. In this case, the jury found infringement under the doctrine of equivalents. This finding presupposes that the jury found an equivalent for each element of the claimed invention, including the "means for securing ." The holes in the arms of VSI's Version 2 hanger tag secure a portion of the eyeglasses frame (the temples) to the hanger member and therefore perform the identical function of the claim element in question. The jury was instructed that the "means for securing" disclosed in the '345 patent "is a mechanically fastened loop that ... can be formed from a separate extension or integral extension and includes either the rivet fastener or the button and hole fastener." Based on this instruction, the jury found ***1322** that the holes in the arms of the Version 2 hanger tag were equivalent to the mechanically fastened loop of the '345 patent under the doctrine of equivalents.

The parties do not dispute that the holes in the arms of the accused device perform a function identical to the extension of the patented device. Furthermore, the holes do not constitute an after-arising technology. Because the functions are identical and the holes are not an after-arising technology, the jury's finding of infringement under the doctrine of equivalents indicates that the jury found insubstantial structural differences between the holes in the arms of the Version 2 hanger tag and the loop of the '345 patent claim element. That finding is also sufficient to support the inference that the jury considered these to be structural equivalents under § 112, ¶ 6. For these reasons, any perceived error in the district court's jury instruction regarding the "means for securing" is, at most, harmless.

[16] Magnivision also argues that the district court improperly construed the "opening means" of claim 1 of the '345 patent. The court instructed the jury that "[t]he 'opening means' is the elongated slot having a notch as described and depicted in the '345 patent, and the structural equivalents thereof." Citing *Al-Site Corp. v. Bonneau Co.*, 22 F.3d 1107, 33 USPQ2d 1136, 1139 (Fed.Cir.1994), Magnivision argues that this court has already construed this structure to be "an enclosed hole and equivalents thereof."

For several reasons, Magnivision's reliance on *Bonneau* fails. First, as Magnivision admits, in *Bonneau,* this court construed claim 8 of the '532 patent, not the claims of the '345 patent. These claims have different language and different meanings. Furthermore, Magnivision did not inform the trial court that *Bonneau* was a non-precedential opinion (in which Magnivision lost), which may only be cited for its issue preclusive effect against Magnivision. Finally, in *Bonneau,* Magnivision argued for a broader claim construction than that eventually adopted by this court. This litigation record gives no reason to think that the court rejected the district court's construction in this case, nor any reason to deny VSI the opportunity to seek a narrower construction. With regard to claim 1 of the '345 patent, the claim element "opening means for receiving cantilever support means and securing a horizontal orientation for the eyeglasses" invokes § 112, ¶ 6, and the district court correctly determined the scope of the claim.

[17] In a further attempt to overturn the jury verdict of infringement under the doctrine of equivalents with respect to the '345, '726, and '911 patents, VSI relies on prosecution history estoppel. This court has reviewed VSI's prosecution history estoppel argument and finds it unpersuasive. To overcome prior art objections by the Examiner, Magnivision amended what became claim 8 of the '532 patent to require that the extension project from the bottom edge portion of the hanger tag. Citing *Mark I Marketing Corp. v. R.R. Donnelley & Sons Co.*, 66 F.3d 285, 291, 36 USPQ2d 1095, 1100 (Fed.Cir.1995), VSI argues that because all of Magnivision's patents arose from related applications, the same prosecution history estoppel applies to them as well. VSI therefore contends that because the arms of its Version 2 hanger tag extend from the sides of the body of the tag, it cannot infringe the claims of these patents under the doctrine of equivalents as restricted by prosecution history estoppel. While in some cases, the prosecution history of a related application may limit application of the doctrine of equivalents in a later filed patent, in this case the specific limitation added in the claims of an earlier issued patent is not present in the claims of the later issued patents. The '345, '726, and '911 patents all have limitations not found in the '532 patent and did not necessarily require the specific limitation added to the claims of the '532 patent to be patentable. The specific limitations added to gain allowance of the '532 patent are not included in and ***1323** are therefore not relevant to determining the scope of the claims of the later issued patents.

In sum, the district court erred by interpreting several of the claim elements in the '345, '726 and '911 patents as means-plus-function elements subject to § 112, ¶ 6. Because, properly construed, these claims do not call for interpretation under § 112, ¶ 6, the district court's reading unnecessarily limited their scope. This court has cautioned against incorporating unwarranted functional or structural limitations from the specification into the claims. *See Transmatic, Inc. v. Gulton Indus., Inc.*, 53 F.3d 1270, 1277, 35 USPQ2d 1035, 1041 (Fed.Cir.1995). Despite the district court's unwarranted restriction of the claims, the jury found infringement under the doctrine of equivalents. Although a reasonable dispute as to the application of the correctly interpreted claims to the accused structure prevents a determination of literal infringement as a matter of law, because the jury found infringement under the trial court's more restricted reading of the claims, this court need not remand for an infringement determination according to this court's broader claim interpretation. Proceeding claim element by claim element, the jury has already found infringement. This court's correction of the claim scope does not disturb that determination.

Validity of the '532, '345, '726, and '911 patents

VSI challenges the validity of all four Magnivision patents under 35 U.S.C. § 103. Specifically, VSI asserts that these patents are obvious in light of U.S. Patent No. 3,738,034 (the Seaver patent) or the 1984 B & G catalog and the knowledge of one of ordinary skill in the art. VSI also asserts obviousness based on the Rosen patent (U.S. Patent No. 3,291,300), the Pacelli patent (U.S. Patent No. 3,116,529), and German Design Patent No. G 8,212,306.3 U1 (the German patent). On appeal, VSI particularly urges that the Cool-Ray catalogs (which depict the commercial embodiment of the Seaver patent), when viewed with the knowledge of one of ordinary skill in the art, render all of the disputed claims invalid for obviousness. The jury considered and rejected VSI's claims of invalidity.

[18][19] Although the determination of obviousness is ultimately a legal conclusion, it rests on underlying factual determinations. *See Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 86 S.Ct. 684, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966). Issued patents have a strong presumption of validity in infringement proceedings. *See* 35 U.S.C. § 282 (1994). Hence, an accused infringer who defends on grounds of patent invalidity bears the burden of showing patent invalidity by clear and convincing evidence. *See Monarch Knitting Mach. v. Sulzer Morat GMBH,* 139 F.3d 877, 881, 45 USPQ2d 1977, 1981 (Fed.Cir.1998).

[20] In a challenge based on obviousness under 35 U.S.C. § 103, the person alleging invalidity must show prior art references which alone or combined with other references would have rendered the invention obvious to one of ordinary skill in the art at the time of invention. *See Dennison Mfg. Co. v. Panduit Corp.*, 475 U.S. 809, 810, 106 S.Ct. 1578, 89 L.Ed.2d 817, 229 USPQ 478, 479 (1986); *Rockwell Int'l Corp. v. United States,* 147 F.3d

1358, 1364, 47 USPQ2d 1027, 1032 (Fed.Cir.1998) . The "presumption of validity under 35 U.S.C. § 282 carries with it a presumption that the Examiner did his duty and knew what claims he was allowing." *Intervet Am., Inc. v. Kee-- Vet Labs., Inc.,* 887 F.2d 1050, 1054, 12 USPQ2d 1474, 1477 (Fed.Cir.1989). Therefore, the challenger's "burden is especially difficult when the prior art was before the PTO examiner during prosecution of the application." *Hewlett-Packard Co. v. Bausch & Lomb Inc.,* 909 F.2d 1464, 1467, 15 USPQ2d 1525, 1527 (Fed.Cir.1990).

[21] The party seeking patent invalidity based on obviousness must also show some motivation or suggestion to combine ***1324** the prior art teachings. *See In re Rouffet,* 149 F.3d 1350, 1355, 47 USPQ2d 1453, 1457 (Fed.Cir.1998); *Motorola,* 121 F.3d at 1472. A suggestion or motivation to combine generally arises in the references themselves, but may also be inferred from the nature of the problem or occasionally from the knowledge of those of ordinary skill in the art. *See Rouffet,* 149 F.3d at 1355.

[22] In this case, the United States Patent and Trademark Office (the PTO) considered nearly all the prior art that VSI asserts renders Magnivision's patents obvious. The PTO considered the Seaver patent during its prosecution of the applications for each of the '345, '726, and '911 patents. The B & G catalog was before the PTO in the application that led to the '911 patent. Moreover, the structure of the B & G reference appears in the Smilow Patent (U.S. Patent No. 3,710,996) which was cited against each of these patents. All of the other references, except the Rosen patent, which is similar to the German patent, were before the PTO in the examinations of one or more of the Magnivision patent applications.

The Seaver patent is the most pertinent prior art. The Seaver patent discloses a security tag for eyeglasses. The Seaver tag is used as an anti- theft device in conjunction with prior art displays. In these displays, the temples of the eyeglasses are not folded, but rather extend through openings in the display. The Seaver security tag is not a hanger display tag and is not designed nor intended to have a cantilevered support extend through it. Neither does the Seaver patent suggest stacking a plurality of folded eyeglasses on a cantilevered support. The Seaver security tag does, however, disclose some elements of the claimed invention, such as a loop that secures the tag to the eyeglasses. Nevertheless, although the Seaver patent discloses some of the elements recited in the Magnivision patents' claims, it does not disclose the display member, the cantilevered support, or the aperture for mounting the hanger tag on the cantilevered support.

[23] VSI argues that it would have been obvious to one of ordinary skill in the art to punch a hole in the Seaver security tag and hang it from a cantilevered support. VSI points to the problems in the art and the Rosen, German, and Pacelli patents to support this conclusion. VSI is unable, however, to point to any specific teaching or suggestion for making this combination. VSI instead relies on what it presumes is the level of knowledge of one of ordinary skill in the art at the time of the invention to supply the missing suggestion to combine. In the first place, the level of skill in the art is a prism or lens through which a judge or jury views the prior art and the claimed invention. This reference point prevents these deciders from using their own insight or, worse yet, hindsight, to gauge obviousness. Rarely, however, will the skill in the art component operate to supply missing knowledge or prior art to reach an obviousness judgment. *See W.L. Gore & Assocs., Inc. v. Garlock, Inc.,* 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed.Cir.1983) ("To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher."). Skill in the art does not act as a bridge over gaps in substantive presentation of an obviousness case, but instead supplies the primary guarantee of objectivity in the process. *See Ryko Mfg. Co. v. Nu- Star, Inc.,* 950 F.2d 714, 718, 21 USPQ2d 1053, 1057 (Fed.Cir.1991).

The level of skill in the art is a factual determination. *See Graham,* 383 U.S. at 17-18. Because the jury considered and rejected VSI's challenge on this grounds, it evidently concluded that one of ordinary skill in the art would not have known to make this combination. This factual finding is supported by substantial evidence. ***1325** VSI's argument in this regard is therefore an

impermissible effort at hindsight recreation. *See Grain Processing Corp. v. American Maize-Prods. Co.*, 840 F.2d 902, 5 USPQ2d 1788, 1792 (Fed.Cir.1988).

The German patent (and the similar Rosen patent) disclose theft- resistant display tags for sunglasses. These display tags are essentially plastic cards with holes for receiving the temples of the sunglasses and another hole for hanging them on a cantilevered support. In some ways, they are similar to the Magnivision patents. In other ways, however, they are quite different. Dr. Chrycy, an expert optometrist, explained that the device disclosed in the German patent would not be suitable as a display tag for reading eyeglasses because it does not allow a person trying them on to determine if they are the correct strength. The plastic card of the German display tag interferes with the proper fit of the eyeglasses and therefore would result in visual distortions or blurring. The Rosen patent has similar drawbacks.

The Pacelli patent also discloses a theft-resistant tag for displaying sunglasses. To secure the glasses, the Pacelli patent uses a sheet of plastic which covers the frame and impairs the view of a person trying on the glasses. Dr. Chrycy testified that this would result in alteration of the view through the lenses and would therefore not serve as a reading glasses display tag.

The B & G catalog primarily discloses belt hangers. Although the catalog discloses possible use of these hangers for eyeglasses, Mr. Hallerman, another expert, testified that they could not be used effectively for holding eyeglasses because they lacked the necessary stability.

Magnivision further supports the jury's factual findings related to nonobviousness with record evidence of secondary considerations. These secondary considerations, such "as commercial success, long felt but unresolved needs, failure of others, etc.," also provide objective proof of nonobviousness. *Dennison,* 475 U.S. at 810. The record shows the commercial success of the claimed invention, including demonstration of a nexus between the commercial success and the patented invention, and evidence of a long felt need for a solution to several of the problems addressed by the invention.

Mort Nyman, an expert in the design, development and marketing of nonprescription reading glasses, testified regarding the problems experienced with prior art eyeglass hangers. He further testified that efforts prior to Magnivision's invention were unsuccessful in solving these problems. Prior art displays were bulky and incapable of displaying several pairs of eyeglasses at the same vertical position. Prior art displays contained openings for insertion of the temples of the eyeglasses and therefore allowed only one pair of eyeglasses per vertical position. Because fewer glasses fit on the prior art displays, vendors had to frequently refill the display rack. Moreover, prior art theft-resistant displays prevented potential customers from effectively trying on the eyeglasses.

Magnivision overcame the deficiencies of the prior art by developing a hanger tag which does not interfere with the opening and closing of the temples or distort the view of the user through the eyeglasses. Furthermore, Magnivision's hanger tags featured an aperture for mounting on a cantilevered support. In this way, several pairs of eyeglasses of the same magnification strength could fit on the display together. Due to this design, store managers no longer needed to frequently refill the eyeglass display rack. For these reasons, the theft-resistant hanger tags disclosed in the Magnivision patents satisfied the long-felt needs of the industry.

Magnivision also presented evidence of commercial success, which further tended to establish the nonobviousness of the claimed inventions. Particularly, Magnivision presented evidence showing that all of the retail chains that sold Magnivision glasses wanted to switch from the prior art displays to Magnivision's patented displays. Magnivision also presented evidence ***1326** showing that as a direct result of Magnivision's patented inventions, the number of locations selling Magnivision eyeglasses more than doubled. This evidence of commercial success further strengthened the district court's determination that the Magnivision patents were not obvious. The factual findings made by the jury underlying this determination are supported by substantial evidence.

Based on the evidence presented at trial, the jury found that VSI failed to provide clear and

convincing evidence of obviousness. Because the finding of obviousness rests on underlying factual determinations, which the jury found adverse to VSI, the district court correctly concluded that the Magnivision patents are not invalid under 35 U.S.C. § 103.

Trade Dress Infringement

[24][25] For areas of law, such as trademark and trade dress infringement, which are not unique to this court's jurisdiction, this court applies the law of the pertinent regional circuit, in this case the United States Court of Appeals for the Eleventh Circuit. *See Pro-Mold and Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1574, 37 USPQ2d 1626, 1631 (Fed.Cir.1996). Under Eleventh Circuit law, a finding of trademark and trade dress infringement is a question of fact. *See AmBrit, Inc. v. Kraft, Inc.*, 812 F.2d 1531, 1535 (11th Cir.1986). A jury verdict of trademark or trade dress infringement is therefore reviewed for substantial evidence. *See John H. Harland Co. v. Clarke Checks, Inc.*, 711 F.2d 966, 973, 219 USPQ 515, 522 (11th Cir.1983) . Legal determinations of the district court, however, receive no deference on review. *See Lucero v. Trosch*, 121 F.3d 591, 599 (11th Cir.1997).

[26][27] Trade dress protection embraces the total image of the product including such factors as the size, shape, and color of the product's packaging and appearance. *See Two Pesos, Inc. v. Taco Cabana, Inc.*, 505 U.S. 763, 765 n. 1, 112 S.Ct. 2753, 120 L.Ed.2d 615, 23 USPQ2d 1081, 1082 n. 1 (1992). To prove trade dress infringement, the plaintiff must show: (1) the inherent distinctiveness or secondary meaning of its trade dress, (2) the essential nonfunctionality of its trade dress, *and* (3) the likelihood of consumer confusion as to origin, sponsorship, or approval due to similarity between its and the defendant's trade dress. *See University of Fla. v. KPB, Inc.*, 89 F.3d 773, 776-77, 39 USPQ2d 1603, 1605 (11th Cir.1996). Because this is a conjunctive test, failure to prove even one of these elements precludes a showing of trade dress infringement. Therefore, the defendant can secure a summary judgment of noninfringement by demonstrating that the plaintiff cannot show any element of the cause of action.

[28][29][30][31] As mentioned above, protection hinges on the distinctiveness or secondary meaning of the trade dress. Distinctive trade dress enables consumers to distinguish a product from others and identify that product with its source. *See id.* at 776 n. 5. The Eleventh Circuit gauges distinctiveness based on whether trade dress "[is] a 'common' basic shape or design, whether it [is] unique or unusual in a particular field, [and] whether it [is] a mere refinement of a commonly adopted and well-known form of ornamentation for a particular class of goods viewed by the public as a dress or ornamentation for the goods." *Id.* (quoting *AmBrit*, 812 F.2d at 1536). Trade dress can also satisfy this requirement by showing secondary meaning, or a "connection in the consumer's mind between the mark and the product's producer, whether that producer is known or unknown." *Id.* The plaintiff may show secondary meaning in several ways. The plaintiff may show secondary meaning with consumer surveys and with evidence of lengthy and uniform display of the dress. *See Conagra, Inc. v. Singleton*, 743 F.2d 1508, 1513, 224 USPQ 552, 555-56 (11th Cir.1984). The plaintiff may also show secondary meaning with evidence of the plaintiff's efforts--usually through advertising--***1327** to establish in the minds of the consumers a connection between the trade dress and its product. *See id.* Finally, the plaintiff may use other evidence showing consumers' association of the trade dress with the plaintiff or its product to prove secondary meaning. *See id.*

[32] Trade dress must also be primarily nonfunctional. A trade dress is functional "if it is essential to the use or purpose of the article or if it affects the cost or quality of the article," *Inwood Labs., Inc. v. Ives Labs., Inc.*, 456 U.S. 844, 850 n. 10, 102 S.Ct. 2182, 72 L.Ed.2d 606, 214 USPQ 1, 4 n. 10 (1982), such that its protection would place a competitor at a significant disadvantage, *see Qualitex Co. v. Jacobson Prods. Co.*, 514 U.S. 159, 165, 115 S.Ct. 1300, 131 L.Ed.2d 248, 34 USPQ2d 1161, 1165 (1995).

[33] Trade dress protection also requires evidence of a likelihood of confusion between the plaintiff's and the defendant's trade dress. Determining whether a likelihood of confusion exists requires weighing several factors: (1) the nature of the plaintiff's mark, (2) the similarity of the marks, (3) the similarity of the products the marks represent, (4) the similarity of the parties' retail outlets and

customers, (5) the similarity of the parties' advertising, (6) the defendant's intent to copy or imitate the plaintiff's mark, and (7) the extent of actual confusion. *See Wesco Mfg., Inc. v. Tropical Attractions of Palm Beach, Inc.,* 833 F.2d 1484, 1488, 5 USPQ2d 1190, 1193-94 (11th Cir.1987).

The jury found that VSI infringed Magnivision's display card and blister pack trade dress, Magnivision's color coding trade dress, and Magnivision's eyeglass styles and colors trade dress. Each of these trade dresses requires separate analysis.

Display Card/Blister Pack Trade Dress

[34][35] Magnivision used a particular display card and blister pack to market its hand-held magnifiers. The display card contains a bold red stripe along its right-hand side and a gray and white cross-hatched background over the remainder of the card. As evidence of distinctiveness of this trade dress, Magnivision presented testimony by Morton Nyman, its president, "that Magnivision is the only company that used this design until it was copied by VSI." Magnivision's use of a display design different from others, however, does not suffice to show distinctiveness in the minds of consumers. Rather, sole use of a design is a preliminary step for a descriptive trade dress to acquire distinctiveness and secondary meaning. *See In re Owens-Corning Fiberglas Corp.,* 774 F.2d 1116, 1125, 227 USPQ 417, 422 (Fed.Cir.1985) ("An evidentiary showing of secondary meaning ... includes evidence of the trademark owner's method of using the mark, supplemented by evidence of the effectiveness of such use to cause the purchasing public to identify the mark with the source of the product.").

In this case, Magnivision did not supply evidence of distinctiveness or secondary meaning. Although Magnivision presented some testimony of sole use, the facts belie any acquisition of secondary meaning. A review of some factors related to secondary meaning show the inadequacy of Magnivision's showing. For instance, with regard to the length and manner of the trade dress use, the record shows that Magnivision used its display design for only two years. Moreover, Magnivision discontinued use of the design two years before VSI put their allegedly infringing packaging on the market. With respect to the nature and extent of advertising and promotion--the efforts by the plaintiff to promote a conscious connection in the public's mind between the trade dress and the plaintiff's business--the record shows that Magnivision made significant promotional expenditures. None of these expenditures or activities, however, was tied to the display card trade dress. The record also contained no evidence that consumers actually recognized Magnivision's allegedly distinctive trade dress for hand-held magnifiers.

***1328** Without evidence of distinctiveness or secondary meaning beyond its assertion of sole use, no reasonable juror could have found that Magnivision's design had acquired secondary meaning. Hence, Magnivision did not supply enough evidence of this first requirement for trade dress infringement to support the jury's verdict. This conclusion alone precludes a finding of trade dress infringement on the display card. Nonetheless, a brief review of the evidence of likelihood of confusion underscores this court's determination.

As mentioned earlier, the likelihood of confusion analysis requires consideration of several factors. In this case, although the consumers and markets were similar, the packaging was not. Comparison of the two packages shows distinct differences in appearance. Specifically, both the graphics and color scheme are different. VSI's accused packaging does not contain either the bold red stripe or the cross-hatched gray and white background of Magnivision's asserted trade dress. VSI's display card contains a dark black band across the top, with gray and blue stripes covering the remainder of the card. Additionally, VSI's ACURAVISION trademark is prominently displayed in the top black band. Furthermore, VSI's accused display card contains other distinctive features such as a broad blue arrow and MAGNA.DOT trademark under the lens of the magnifier.

Perhaps because of the substantial differences between the accused packaging and Magnivision's asserted trade dress, Magnivision did not produce any evidence of actual customer confusion. The record as a whole lacks evidence to support the jury's finding of a likelihood of consumer confusion.

No reasonable juror could have found trade dress infringement of the display cards. Because the district court based its injunction prohibiting similar display cards on other accessories on the jury's finding of display card infringement, the district court abused its discretion in enjoining the use of the accessory packages.

Color Coding Trade Dress

[36] The jury also found that VSI had infringed Magnivision's trade dress in its color coding system. This alleged trade dress is an array of horizontal color-coded stripes on Magnivision's eyeglass hanger tags which identify the power of the glasses. Under this system, the hangers for eyeglasses of a particular power would feature a particular color. Eyeglasses of a different power would hang from a tag with a different color.

[37] At the outset, the record does not contain sufficient evidence to show any distinctiveness or secondary meaning for Magnivision's color coding system. Color itself is not inherently distinctive. *See Qualitex,* 514 U.S. at 163 ("[O]ver time, customers may come to treat a particular color on a product or its packaging (say, a color that in context seems unusual, such as pink on a firm's insulating material or red on the head of a large industrial bolt) as signifying a brand."). Thus, to support its finding of infringement, the jury must have found secondary meaning in this color-coding system. The record, however, discloses no evidence to support such a finding.

[38] Other companies used color coding to market non-prescription reading glasses for many years. Thus, Magnivision has a significant burden to show that its particular color-coding system had acquired source-identifying significance in the minds of the consuming public. Magnivision's burden becomes almost insurmountable in light of the evidence showing that its coloring system changed from time to time. "Absent a specifically defined, color-definite, and *stable* visual appearance, an alleged trade dress cannot receive protection." *Keystone Camera Prods. Corp. v. Ansco Photo-Optical Prods. Corp.,* 667 F.Supp. 1221, 1229, 3 USPQ2d 1797, 1802 (N.D.Ill.1987) (emphasis added).

Although the actual colors Magnivision associated with particular diopter strengths did not change significantly, ***1329** Magnivision changed its coding method several times. At various times Magnivision used three different ways to signify diopter strength: the color of the diopter numbers, a horizontal stripe of color across one side of the tag, or a colored rectangle. Without a stable visual appearance and absent any other evidence of consumer identification of the Magnivision's color-coding system, no reasonable juror could conclude that the stripe of color now asserted as a trade dress has acquired secondary meaning.

Furthermore, even if Magnivision could show secondary meaning in its color coding system, color coding cannot act as an indicator of source because it is primarily functional. *See Two Pesos,* 505 U.S. at 775 (trade dress is functional if it "is one of a limited number of equally efficient options available to competitors and free competition would be hindered by according the design trademark protection"); *Spraying Sys. Co. v. Delavan, Inc.,* 762 F.Supp. 772, 781, 19 USPQ2d 1121, 1128 (N.D.Ill.1991), *aff'd,* 975 F.2d 387, 24 USPQ2d 1181 (7th Cir.1992) ("color coding *as an identification system* is clearly functional"). In this case, the record shows that Magnivision used color coding to indicate diopter strength, not to indicate source. Magnivision itself stated that color coding allows the racks to be serviced more easily, aids consumers in selecting the correct diopter, and reduces the time and cost of restocking the glasses. Additionally, as noted earlier, color coding serves these same cost-saving functions for many competitors in the non- prescription eyeglass industry. To give one competitor an exclusive right to practice color-coding would give it a significant advantage over other companies.

Because color coding is primarily functional, the record refutes the jury's verdict of trade dress infringement of Magnivision's color coding system. On the basis of this record, this court concludes that no reasonable juror could have found trade dress infringement of Magnivision's color coding scheme because of the functional nature of the trade dress and the lack of showing of secondary meaning. This court, therefore, need not proceed to examine the likelihood of confusion. Because the jury verdict of trade dress infringement lacks substantial evidence, the district court abused its discretion by enjoining VSI's use of its hanger tag

labels based on trade dress infringement.

Eyeglass Styles and Colors Trade Dress

[39] The jury also found that VSI infringed the trade dress of six of Magnivision's eyeglass styles. Once again, however, the record contains insufficient evidence that Magnivision's colors or styles were inherently distinctive or possessed secondary meaning. Mr. Nyman testified that Magnivision purchased its allegedly distinctive styles from publicly available molds. VSI purchased its accused styles from publicly available stock as well. This evidence of the public availability of Magnivision's product raises significant hurdles to a finding that its styles are inherently distinctive as an indicator of source. *See Mana Prods., Inc. v. Columbia Cosmetics Mfg., Inc.*, 65 F.3d 1063, 1070, 36 USPQ2d 1176, 1180 (2nd Cir.1995) (When similar packaging can be purchased by other companies and is publicly available, "it defies simple logic to suggest that the packaging was inherently distinctive.").

Magnivision produced no evidence of secondary meaning. The record demonstrates that it changed its styles to suit demand. Constantly changing styles rarely demonstrate the stability necessary for the public to identify those particular characteristics with a particular source. *See, e.g., Keystone,* 667 F.Supp. at 1226 (identifying the significant weakness in the plaintiff's trade dress claim as being that the Le Clic "look" was "nothing more than a reflection of the fashion trends taking place generally in the marketplace of youthful consumers."). Thus, the record shows that the publicly available, constantly changing styles of Magnivision's eyeglasses lacked secondary meaning.

***1330** Without inherent distinctiveness or secondary meaning, Magnivision's eyeglass styles and colors lacked a protectable trade dress. Absent a protectable trade dress, no reasonable juror could find trade dress infringement.

Trademark Infringement of the MAGNIVISION mark

[40][41] The jury found that VSI's mark MAGNA.DOT infringes Magnivision's MAGNIVISION mark. To prove trademark infringement, a trademark owner must show a likelihood that consumers would confuse the defendant's mark with the protected mark. *See Dieter v. B & H Indus. of Southwest Fla., Inc.*, 880 F.2d 322, 326, 11 USPQ2d 1721, 1723 (11th Cir.1989). The Eleventh Circuit identifies several factors which contribute to a likelihood of confusion finding: (1) the nature of the plaintiff's mark, (2) the similarity of the marks, (3) the similarity of the products represented by the marks, (4) the similarity of the retail outlets and consumers, (5) the nature and extent of the parties' advertising, (6) the defendant's intent to copy the plaintiff's mark, and (7) the extent of actual confusion. *See Wesco,* 833 F.2d at 1488; *Coach House Restaurant, Inc. v. Coach and Six Restaurants Inc.*, 934 F.2d 1551, 1561, 19 USPQ2d 1401, 1409 (11th Cir.1991). Other relevant factors include the strength of the marks, the number and nature of similar marks in use on similar goods, the nature and extent of any actual confusion and the length of time during and conditions under which there has been concurrent use without evidence of actual confusion. *See In re E.I. DuPont DeNemours & Co.*, 476 F.2d 1357, 1361, 177 USPQ 563, 567 (CCPA 1973).

[42] Similarity of the marks is a hallmark of consumer confusion. *See E. Remy Martin & Co., S.A. v. Shaw-Ross Int'l Imports, Inc.*, 756 F.2d 1525, 1531, 225 USPQ 1131, 1135 (11th Cir.1985) ("In evaluating the similarity of marks, we must consider ... the appearance, sound and meaning of the marks, as well as the manner in which they are displayed."). In this instance, however, the marks do not present a similar sound, meaning, or commercial impression. The MAGNIVISION mark is a single word; the MAGNA.DOT mark consists of two words separated by a darkened circle. The MAGNIVISION mark has four syllables; the MAGNA.DOT mark has three. The MAGNIVISION mark displays eleven letters, the last seven of which do not appear in the MAGNA.DOT mark; the MAGNA.DOT mark has eight letters and a dot.

The only similarity between the marks is the MAGNA/MAGNI prefix. The record shows, however, that the MAGNA/MAGNI prefix as well as the VISION suffix enjoy wide use in the eyeglass industry on similar goods and services. This evidence included a number of registered trademarks for magnification lenses and eyeglasses

(i.e., MAGNA ADD, MAGNA THIN, MAGNA-BAR, MAGNA-COM, MAGNA-LITE, MAGNA-PAGE, MAGNA-RULE, MAGNA-SIGHTER, MAGNATEL, MAGNI-FOCUSER, MAGNI-LENS, MAGNI-SPECS, MAGNI-STAT, MAGNI-VIEWER, COOPERVISION, VALLEN VISION, ACURAVISION, CLEAR VISION, COOP VISION, COYOTE VISION, CRYSTAL VISION, POWER VISION, SELECT-A-VISION, TRUVISION, ULTRAVISION). The common usage of these descriptive terms weighs strongly against a finding of likelihood of confusion. *See, e.g., Sun Banks of Fla., Inc., v. Sun Fed. Sav. & Loan Ass'n,* 651 F.2d 311, 316, 211 USPQ 844, 849 (5th Cir.1981) ("[W]e find the extensive third-party use of the word 'Sun' impressive evidence that there would be *no* likelihood of confusion between Sun Banks and Sun Federal.").

The record shows that these trademarks appeared side-by-side on similar products and in similar retail outlets over a period of several years. Magnivision's own documents allege that MAGNIVISION "has become the generic term for [over-the-counter] reading glasses ." Also, Magnivision made extensive advertising expenditures to promote the recognition of its mark. Nonetheless, the record contains ***1331** no showing of actual confusion between the two marks.

The differences in the marks, the absence of actual confusion despite several years of simultaneous use in an identical market, the absence of evidence that VSI intended to copy Magnivision's mark, and the weakness of the descriptive MAGNIVISON mark add up to a finding of noninfringement as a matter of law. Accordingly, this court holds that no reasonable juror could have found infringement of the MAGNIVISION trademark by the MAGNA.DOT mark.

Unfair Competition

[43][44] Because the only evidence of unfair competition in this case was Magnivision's claims of trademark and trade dress infringement, the jury's finding of unfair competition lacks substantial evidence. Unfair competition provides an additional degree of protection above that provided by trademark and trade dress law. *See Freedom Sav. & Loan Ass'n v. Way,* 757 F.2d 1176, 1186, 226 USPQ 123, 130 (11th Cir.1985). Although trademark and trade dress infringement may be the basis for a claim of unfair competition, it frequently requires the court to examine additional conduct that would not give rise to a claim of trademark infringement. *See id.*

In this case, the only evidence in support of the unfair competition claims was the trademark and trade dress infringement claims. As stated earlier, no reasonable juror could find a likelihood of confusion between the trade dress and trademarks of VSI and Magnivision. Therefore, on the evidence presented, no reasonable juror could find that VSI engaged in unfair competition with Magnivision.

Personal Liability of Myron Orlinsky

[45] Title 35 authorizes a finding that an officer of a corporation is personally liable for the corporation's acts of infringement. *See* 35 U.S.C. § 271(a) (1994); *Manville Sales Corp. v. Paramount Sys., Inc.,* 917 F.2d 544, 552, 16 USPQ2d 1587, 1593 (Fed.Cir.1990). Personal liability under § 271(a), however, requires sufficient evidence to justify piercing the corporate veil. *See id.* The corporate entity deserves respect and legal recognition unless specific, unusual circumstances justify disregarding the corporate structure. *See id.* The most common reason for disregarding the corporate structure is that the "corporation was merely the alter ego of its officers." *Id.*

[46] The record shows that Myron Orlinsky made the sole decision to continue using the hanger tags after VSI received cease and desist letters from Magnivision. The record, however, shows no further evidence of personal activity by Mr. Orlinsky. This evidence does not establish that Mr. Orlinsky overstepped his authority as CEO of VSI. Rather the record shows that Mr. Orlinsky acted consistent with his authority as CEO. Therefore, the record only supports the conclusion that Mr. Orlinsky acted within and according to the strictures of the corporate structure. The record shows no instance of the corporation operating as Mr. Orlinsky's alter ego. Thus, the record contains no evidence to justify piercing the corporate veil. *See, e.g., id.* at 553 ("Although these facts support the conclusion that the officers had knowledge of their acts, these acts were within the scope of their

employment and thus were protected by the corporate veil.")

Furthermore, after VSI received the cease and desist letter, Mr. Orlinsky consulted counsel before continuing to produce the Version 1 and 2 hanger tags. The record thus shows that Mr. Orlinsky acted pursuant to a good faith belief of noninfringement engendered by advice of counsel. Once again, this evidence does not justify rejecting legal recognition of the corporate structure. *See id.* at 553. In sum, the record does not contain sufficient evidence that Mr. Orlinsky acted outside of the scope of his employment or that he continued to manufacture the hanger ***1332** tags knowing that they infringed Magnivision's patents.

IV.

In conclusion, although the district court erred in its construction of the claims of the '345, '726 and '911 patents, these errors were harmless because of the jury's finding of infringement under the doctrine of equivalents. This court therefore affirms the district court's decision not to grant judgment as a matter of law of non-infringement. The jury's findings with respect to trademark and trade dress infringement, however, are unsupported by substantial evidence. Furthermore, because the finding of unfair competition rested solely on the findings of trademark and trade dress infringement, that finding is also unsupported by substantial evidence. The district court therefore erred in failing to grant judgment as a matter of law that VSI did not infringe Magnivision's asserted trademark and trade dress and that it did not engage in unfair competition. This court therefore reverses the decision of the district court not to grant judgment as a matter of law with respect to the absence of trademark and trade dress infringement and the absence of unfair competition. Additionally, because the jury findings of trademark and trade dress infringement and unfair competition lacked substantial evidence, the district court's entry of a permanent injunction was an abuse of discretion. The district court's entry of the permanent injunction is thus vacated to the extent it prohibited VSI from using its accused trademark, display cards and hanger tag color coding scheme. Furthermore, there is insufficient evidence to support holding Mr. Orlinsky personally liable for the damage award. The district court's conclusion to the contrary is therefore reversed.

COSTS

Each party shall bear its own costs.

AFFIRMED-IN-PART and REVERSED-IN-PART.

174 F.3d 1308, 50 U.S.P.Q.2d 1161

Briefs and Other Related Documents (Back to top)

• 1999 WL 33645062 (Appellate Brief) Brief by Appellants Al-Site Corporation and Magnivision, Inc. in Opposition to Combined Petition for Panel Rehearing and for Rehearing En Banc (May. 13, 1999) (Appellate Brief) Brief by Appellants Al-Site Corporation and Magnivision, Inc. in Opposition to Combined Petition for Panel Rehearing and for Rehearing En Banc (May. 13, 1999) Original Image of this Document (PDF)

• 1998 WL 34097788 (Appellate Brief) Reply Brief of Defendants-Cross Appellants VSI International Inc. and Myron Orlinsky (Apr. 15, 1998) (Appellate Brief) Reply Brief of Defendants-Cross Appellants VSI International Inc. and Myron Orlinsky (Apr. 15, 1998) Original Image of this Document (PDF)

• 1998 WL 34097790 (Appellate Brief) Reply and Opposition Brief of Appellants Al-Site Corporation and Magnivision, Inc. (Mar. 06, 1998) (Appellate Brief) Reply and Opposition Brief of Appellants Al-Site Corporation and Magnivision, Inc. (Mar. 06, 1998) Original Image of this Document (PDF)

• 1998 WL 34097792 (Appellate Brief) Brief of Defendants-Cross-Appellants VSI International Inc. and Myron Orlinsky (Jan. 20, 1998) (Appellate Brief) Brief of Defendants-Cross-Appellants VSI International Inc. and Myron Orlinsky (Jan. 20, 1998) Original Image of this Document (PDF)

• 1997 WL 33544957 (Appellate Brief) Brief for Appellants Al-Site Corporation and Magnivision, Inc. (Dec. 10, 1997) (Appellate Brief) Brief for Appellants Al-Site Corporation and Magnivision, Inc. (Dec. 10, 1997) Original Image of this Document with Appendix (PDF)

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217 F.3d 1365
55 U.S.P.Q.2d 1313
(Cite as: 217 F.3d 1365)

Briefs and Other Related Documents

United States Court of Appeals,
Federal Circuit.

In re Werner KOTZAB.

No. 99-1231.
(Reexamination No. 90/004,441).

June 30, 2000.

In reexamination proceeding, the Board of Patent Appeals and Interferences held that claims in patent involving temperature-controlled injection molding method for forming plastic articles were unpatentable for obviousness. Patentee appealed. The Court of Appeals, Linn, Circuit Judge, held that patent claims were not rendered obvious by prior art reference.

Reversed.

West Headnotes

[1] Patents 16(3)
291k16(3) Most Cited Cases

A claimed invention is unpatentable if the differences between it and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. 35 U.S.C.A. § 103(a).

[2] Patents 16.13
291k16.13 Most Cited Cases

The ultimate determination of whether an invention would have been obvious under the patent statute is a legal conclusion based on underlying findings of fact. 35 U.S.C.A. § 103(a).

[3] Patents 113(6)
291k113(6) Most Cited Cases

Court of Appeals reviews de novo an ultimate determination of obviousness by the Board of Patent Appeals and Interferences, but reviews the Board's underlying factual findings for substantial evidence. 35 U.S.C.A. § 103(a).

[4] Federal Courts 846
170Bk846 Most Cited Cases

Substantial evidence is something less than the weight of the evidence but more than a mere scintilla of evidence, and, in reviewing the record for substantial evidence, Court of Appeals must take into account evidence that both justifies and detracts from the factual determinations.

[5] Patents 113(6)
291k113(6) Most Cited Cases

The possibility of drawing two inconsistent conclusions from the evidence does not prevent findings of the Board of Patent Appeals and Interferences from being supported by substantial evidence; indeed, if a reasonable mind might accept the evidence as adequate to support the factual conclusions drawn by the Board, then Court of Appeals must uphold the Board's determination.

[6] Patents 16(3)
291k16(3) Most Cited Cases

[6] Patents 16(4)
291k16(4) Most Cited Cases

Critical step in analyzing the patentability of claims, as to obviousness, is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field, and close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher. 35 U.S.C.A. § 103(a).

[7] Patents 26(1)
291k26(1) Most Cited Cases

Identification in the prior art of each individual part claimed in a patent is insufficient to defeat patentability of the whole claimed invention; rather, to establish obviousness based on a combination of

the elements disclosed in the prior art, there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant. 35 U.S.C.A. § 103(a).

[8] Patents ⚿16.5(1)
291k16.5(1) Most Cited Cases

Even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. 35 U.S.C.A. § 103(a).

[9] Patents ⚿26(1)
291k26(1) Most Cited Cases

The motivation, suggestion, or teaching to combine prior art elements, as would support a finding of obviousness, may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, in some cases the nature of the problem to be solved. 35 U.S.C.A. § 103(a).

[10] Patents ⚿26(1)
291k26(1) Most Cited Cases

The teaching, motivation, or suggestion to combine prior art elements that would support a finding of obviousness may be implicit from the prior art as a whole, rather than expressly stated in the references; the test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. 35 U.S.C.A. § 103(a).

[11] Patents ⚿36(1)
291k36(1) Most Cited Cases

Whether the Board of Patent Appeals and Interferences relies on an express or an implicit showing of some motivation, suggestion, or teaching to combine prior art elements, in analyzing obviousness of patent, it must provide particular findings related thereto; broad conclusory statements standing alone are not evidence. 35 U.S.C.A. § 103(a).

[12] Patents ⚿16.14
291k16.14 Most Cited Cases

Patent claims involving temperature-controlled injection molding method for forming plastic articles were not rendered obvious by prior art reference, as prior art reference did not teach or suggest use of single temperature sensor to control plurality of flow control valves, as set forth by patent claims. 35 U.S.C.A. § 103(a).

Patents ⚿328(2)
291k328(2) Most Cited Cases

5,427,720. Valid.
***1367** Robert F.I. Conte, Lee, Mann, Smith, McWilliams, Sweeney & Ohlson, of Chicago, Illinois, argued for appellant. Of counsel were Thomas Eugene Smith and James B. Conte.

Mark Nagumo, Associate Solicitor, U.S. Patent and Trademark Office, of Arlington, Virginia, argued for the appellee. With him on the brief were Albin F. Drost, Acting Solicitor, John M. Whealan, Acting Deputy Solicitor, and Stephen Walsh, Associate Solicitor.

Before LOURIE, GAJARSA, and LINN, Circuit Judges.

LINN, Circuit Judge.

DECISION

Werner Kotzab appeals from the final decision of the Board of Patent Appeals and Interferences ("Board") holding claims 1-10 in reexamination number 90/004,441 unpatentable for obviousness under 35 U.S.C. § 103(a). *See Ex Parte Kotzab,* Paper No. 17 (BPAI July 15, 1998). This case was submitted for our decision following oral argument on April 4, 2000. Because certain of the Board's key factual findings relating to its obviousness analysis are not supported by substantial evidence, and because the Board erred in concluding that the claims would have been obvious as a matter of law, we reverse.

BACKGROUND
A. The Invention

The invention involves an injection molding method for forming plastic articles. In such

methods, the temperature of the mold must be controlled so that the plastic can harden uniformly throughout the mold. Kotzab was confronted with the problem of providing optimal temperature control for an injection molding method to ensure the quality of the final product on the one hand, and achieving optimally short molding cycle times on the other hand. He arrived at a solution which is embodied in claim 1 of the reexamination as follows:

> 1. An improved method of controlling the temperature of an injection mold by pressure feeding molding material into a mold recess of an injection mold by an extruder, curing the material in the mold, and removing molded material from the mold, said pressure feeding, curing, and removing being a molding cycle of recurring molding cycles and said recurring molding cycles having at least a first molding cycle and a second molding cycle,
> comparing a preset nominal temperature to an actual temperature measured by at least one temperature sensor during said first molding cycle and said second molding cycle and supplying an amount of a temperature controlling medium to the first molding cycle and the second molding cycle, said amount of temperature controlling medium being dependent on the deviation between the actual temperature measured and the desired preset nominal temperature, the improvement comprising:
> controlling, via a single sensor, a plurality of flow control valves for the temperature ***1368** controlling medium to provide impulse temperature control medium to the first and second molding cycles,
> determining empirically or by calculation a quantitative spacial distribution of temperature controlling medium needed to obtain said desired preset nominal temperature during at least the first molding cycle and the second molding cycle and determining empirically or by calculation the conduits needed to be utilized to obtain the desired preset nominal temperature during at least the first molding cycle and the second molding cycle,
> comparing said desired preset nominal temperature to said actual temperature, at least once during the first molding cycle and the second molding cycle at a certain point in time being the same for each said molding cycle, such that said comparison made during said first cycle is synchronized with said comparison made during said second subsequent molding cycle, and said plurality of flow control valves are triggered during each said cycle to provide said impulse control medium, and said triggering being dependent on the deviation of temperature determined for each said comparison and also being dependent on a stored profile of said quantitative spacial distribution of the temperature controlling medium.

J.A. at 18-19.

Claim 3, which depends from claim 1, adds the following further limitation: "wherein a flow measuring turbine is associated with each flow control valve to detect the actual flow in each cycle and wherein a proportioning of a cooling or heating medium is effected in dependence on a comparison of a nominal flow to the actual flow." *Id.* at 19.

Claim 10, which depends from claim 3, additionally provides that "the rotation of said measuring turbine is transferred into pulses, so that the nominal flow [of the temperature controlling medium] can be fixed by the presetting of a corresponding number of pulses." *Id.* at 20.

B. The Reexamination Proceeding

U.S. Patent 5,427,720 ("the '720 patent") issued to Kotzab on June 27, 1995. A third party filed a request for reexamination on November 4, 1996. The reexamination was granted and assigned control no. 90/004,441. The amended claims were finally rejected by the Examiner, and Kotzab appealed the rejections to the Board. On July 15, 1998, the Board affirmed the Examiner's rejection of the claims for essentially the reasons expressed in the Examiner's Answer. The Board did, however, provide its own additional comments primarily for emphasis.

Specifically, the Board agreed with the Examiner that WO 92/08598 ("Evans") discloses a process of controlling the temperature of an injection mold by using a sensor to control the pulsing of a temperature control medium through the mold. Moreover, the Board found, as explained by the Examiner, that Evans discloses in a less preferred embodiment, using only one temperature measurement to control the coolant pulses rather than an average temperature measurement. *See*

Evans application, p. 6, II. 17-23.

In addition, the Board found that Evans discloses that "the optimum timing of the cooling flow can be selected in accordance with the known temperature of the mould." *Id.* at II. 6-8. Furthermore, the Board found that a prior art promotional article discloses that manipulation of the geometry and layout of the cooling segment provides for the greatest improvement in molding cycle. *See* Horst Wieder, *Understanding the pulse modulated mold temperature control method,* (CITO Products, Inc., WI.) 1987, at p. 1, col. 2, II. 13-16. And, the Board determined that a May 1984 prior art article indicates that it was known to establish a cooling regime before the mold is produced, and that the determination of the cooling regime includes the number and location of the cooling conduits, as well as the volume of the coolant flow. Thus, the Board concluded that the evidence of record indicates that it ***1369** was known in the art to utilize empirical data to design the mold and the distribution of cooling channels in that mold. In view of the foregoing, the Board found that the empirical determination of the necessary spacial distribution of the length of the cooling pulses needed for delivering the appropriate coolant is disclosed by Evans or was known at the time the invention was made. Consequently, the Board affirmed the Examiner's rejection of claims 1, 2, and 4-9 under 35 U.S.C. § 103(a) as being unpatentable over Evans.

The Board made additional findings related to claims 3 and 10 in determining that they were also unpatentable under 35 U.S.C. § 103(a) over Evans in view of certain secondary references.

Kotzab filed a request for reconsideration, which the Board denied on November 24, 1998. In that decision, the Board reiterated agreement with the Examiner that it would have been obvious for one of ordinary skill in the art to utilize only one temperature measurement to control the coolant pulses in light of the Evans disclosure. Kotzab timely appealed the Board's decision to this court. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A) (1994).

DISCUSSION

A. Standard of Review

[1][2][3] A claimed invention is unpatentable if the differences between it and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. *See* 35 U.S.C. § 103(a) (Supp. III 1997); *In re Dembiczak,* 175 F.3d 994, 998, 50 USPQ2d 1614, 1616 (Fed.Cir.1999). The ultimate determination of whether an invention would have been obvious under 35 U.S.C. § 103(a) is a legal conclusion based on underlying findings of fact. *See Dembiczak,* 175 F.3d at 998, 50 USPQ2d at 1616. We review the Board's ultimate determination of obviousness de novo. *See id.* However, we review the Board's underlying factual findings for substantial evidence. *See In re Gartside,* 203 F.3d 1305, 1316, 53 USPQ2d 1769, 1776 (Fed.Cir.2000).

[4][5] Substantial evidence is something less than the weight of the evidence but more than a mere scintilla of evidence. *See id.* at 1312, 203 F.3d 1305, 53 USPQ2d at 1773 (quoting *Consolidated Edison Co. v. NLRB,* 305 U.S. 197, 229-30, 59 S.Ct. 206, 83 L.Ed. 126 (1938)). In reviewing the record for substantial evidence, we must take into account evidence that both justifies and detracts from the factual determinations. *See id.* (citing *Universal Camera Corp. v. NLRB,* 340 U.S. 474, 487-88, 71 S.Ct. 456, 95 L.Ed. 456 (1951)). We note that the possibility of drawing two inconsistent conclusions from the evidence does not prevent the Board's findings from being supported by substantial evidence. *See id.* Indeed, if a reasonable mind might accept the evidence as adequate to support the factual conclusions drawn by the Board, then we must uphold the Board's determination. *See id.*

B. Analysis

[6] A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. *See Dembiczak,* 175 F.3d at 999, 50 USPQ2d at 1617. Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention

taught is used against its teacher." *Id.* (quoting *W.L. Gore & Assocs., Inc. v. Garlock, Inc.,* 721 F.2d 1540, 1553, 220 USPQ 303, 313 (Fed.Cir.1983)).

[7][8] Most if not all inventions arise from a combination of old elements. *See In re Rouffet,* 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed.Cir.1998). Thus, ***1370** every element of a claimed invention may often be found in the prior art. *See id.* However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. *See id.* Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant. *See In re Dance,* 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed.Cir.1998); *In re Gordon,* 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed.Cir.1984). Even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. *See B.F. Goodrich Co. v. Aircraft Braking Sys. Corp.,* 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed.Cir.1996).

[9][10][11] The motivation, suggestion or teaching may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, in some cases the nature of the problem to be solved. *See Dembiczak,* 175 F.3d at 999, 50 USPQ2d at 1617. In addition, the teaching, motivation or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references. *See WMS Gaming, Inc. v. International Game Tech.,* 184 F.3d 1339, 1355, 51 USPQ2d 1385, 1397 (Fed.Cir.1999). The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. *See In re Keller,* 642 F.2d 413, 425, 208 USPQ 871, 881 (1981) (and cases cited therein). Whether the Board relies on an express or an implicit showing, it must provide particular findings related thereto. *See Dembiczak,* 175 F.3d at 999, 50 USPQ2d at 1617. Broad conclusory statements standing alone are not "evidence." *Id.*

[12] Kotzab's primary argument that the Board erred in holding claims 1-10 unpatentable under 35 U.S.C. § 103(a) over Evans, or Evans in view of secondary references, is that Evans does not teach or suggest the use of a single temperature sensor to control a plurality of flow control valves. We agree.

As noted previously, the Board adopted the Examiner's reasoning in upholding the rejection of the claims and added further comments. None of the Board's comments relate to the issue of Evans teaching or suggesting the use of one *sensor* to control a number of valves regulating coolant flow to the mold. Thus, we look to the Examiner's reasons for finding this limitation to be expressly taught or suggested in Evans.

The Examiner cites Evans for teaching that "one *system* constructed and operated according to the invention may be used to control a number of valves." Evans application, p. 19, II. 6-8 (emphasis added). In view of this disclosure only, the Examiner concluded that Evans teaches the use of one *sensor* to control a number of valves. This conclusion must necessarily rest on the unstated premise by the Examiner that "one system" is equal to "one sensor."

But the Board's decision, adopting the Examiner's premise, lacks the necessary substantial evidence to support a rejection of Kotzab's claims. Specifically, there is not substantial evidence to show that "one system" is the same thing as "one sensor." The words "sensor" and "probe" are used throughout Evans to refer to the device that measures the mold temperature. Evans uses the word "signal" to refer to the response generated by the measured temperature that controls the valves for coolant flow. Finally, the word "system" is used in Evans to refer to the overall temperature control system that is responsible for the valve timing for coolant flow to increase or decrease the temperature of the mold. Evans clearly never uses the term "system" as a substitute for the simple temperature measuring device it calls "sensor." And, the Board made no reference to any evidence in the record that ***1371** would equate "one system" with "one sensor."

As mentioned previously, more than a mere scintilla of evidence is necessary to support the Board's implicit conclusion that "one system" is equal to "one sensor." Based on the entirety of Evans' disclosure, we cannot say that there is such relevant evidence as a reasonable mind might

accept as adequate to support the conclusion that "one system" means "one sensor."

The United States Patent and Trademark Office argues that because Evans teaches that a single sensor may be used to provide "the temperature measurement at a selected part of the machine," it necessarily follows that the Evans "system" discussed later may have a single sensor--and that single sensor may control more than one valve. *See id.* at p. 6, II. 21-23; p. 19, II. 6- 8. While the test for establishing an implicit teaching, motivation, or suggestion is what the combination of these two statements of Evans would have suggested to those of ordinary skill in the art, the two statements cannot be viewed in the abstract. Rather, they must be considered in the context of the teaching of the entire reference. Further, a rejection cannot be predicated on the mere identification in Evans of individual components of claimed limitations. Rather, particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.

We do not take issue with the argument that Evans suggests the concept of using the historic temperature obtained by one temperature measurement to control coolant pulses. *See id.* at p. 5, II. 14-22; p. 6, II. 17-23. However, there is not substantial evidence of record to extrapolate this teaching to the multiple zone system described later in Evans. *See id.* at p. 18, I. 22 to p. 19, I. 8. In the multiple zone system, Evans describes the use of a temperature sensor and an associated flow control valve in each zone. At most, the combined teachings suggest that the historic temperature of a mold zone may be measured by one sensor, and as part of a multiple zone system where multiple valves are controlled, that one sensor measurement can be used to control the valve for that zone. Thus, we cannot say that there is such relevant evidence as a reasonable mind might accept as adequate to support the conclusion that where there are a plurality of control valves in a multiple zone setting, only one temperature sensor provides the control for a plurality of valves.

Moreover, we cannot say that there is such relevant evidence as a reasonable mind might accept as adequate to support implicitly the conclusion that a skilled artisan confronted with (1) the problem noted by Kotzab, i.e., providing optimal temperature control for an injection molding method to ensure the quality of the final product on the one hand, and achieving optimally short molding cycle times on the other hand, and (2) the two statements in Evans, would have been motivated to control a plurality of valves in a multiple zone setting with only one temperature sensor.

In this case, the Examiner and the Board fell into the hindsight trap. The idea of a single sensor controlling multiple valves, as opposed to multiple sensors controlling multiple valves, is a technologically simple concept. With this simple concept in mind, the Patent and Trademark Office found prior art statements that in the abstract appeared to suggest the claimed limitation. But, there was no finding as to the specific understanding or principle within the knowledge of a skilled artisan that would have motivated one with no knowledge of Kotzab's invention to make the combination in the manner claimed. In light of our holding of the absence of a motivation to combine the teachings in Evans, we conclude that the Board did not make out a proper *prima facie* case of obviousness in rejecting claims 1, 2, and 4-9 under 35 U.S.C. § 103(a) over Evans. Moreover, because the rejections of claims 3 and 10 rely upon the foregoing, we also ***1372** conclude that the Board did not make out a proper *prima facie* case of obviousness in rejecting those claims under 35 U.S.C. § 103(a).

CONCLUSION

For the above reasons, we conclude that there is not substantial evidence to support the Board's finding of fact that Evans expressly teaches that "one sensor" may be used to control a plurality of valves, and there is not substantial evidence of record, either expressly or implicitly, to modify the teachings of Evans to obtain a system in which one sensor controls a plurality of valves. Accordingly, we

REVERSE.

217 F.3d 1365, 55 U.S.P.Q.2d 1313

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• 1999 WL 33631198 (Appellate Brief) Reply Brief for Appellant (Oct. 28, 1999) (Appellate Brief) Reply Brief for Appellant (Oct. 28, 1999) Original Image of this Document (PDF)

• 1999 WL 33631159 (Appellate Brief) Brief for Appellee Commissioner of Patents and Trademarks (Oct. 12, 1999) (Appellate Brief) Brief for Appellee Commissioner of Patents and Trademarks (Oct. 12, 1999) Original Image of this Document (PDF)

• 1999 WL 33631196 (Appellate Brief) Brief for Appellant (Aug. 30, 1999) (Appellate Brief) Brief for Appellant (Aug. 30, 1999) Original Image of this Document with Appendix (PDF)

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933 F.2d 982
18 U.S.P.Q.2d 1885
(Cite as: 933 F.2d 982)

C

United States Court of Appeals,
Federal Circuit.

In re Jeffrey B. **GORMAN** and Marilyn Katz.

No. 90-1362.

May 13, 1991.

Application for patent was denied by United States Patent and Trademark Office, Board of Patent Appeals and Interferences, on ground of obviousness, and appeal was taken. The Court of Appeals, Pauline Newman, Circuit Judge, held that denial of patent for composite candy sucker on stick, molded in elastomeric mold in shape of human thumb, on ground of obviousness, was sufficiently supported by evidence.

Affirmed.

West Headnotes

[1] Patents ⇐16(3)
291k16(3) Most Cited Cases

In deciding whether to reject patent application for obviousness, criteria is not number of prior references, but what they would have meant to person of ordinary skill in field of invention. 35 U.S.C.A. § 103.

[2] Patents ⇐26(1.1)
291k26(1.1) Most Cited Cases
(Formerly 291k26(11/4))

Determination of whether new combination of known elements would have been obvious to one of ordinary skill, and thus is not patentable, depends on various factors, including whether elements exist in "analogous art," that is, art that is reasonably pertinent to problem with which inventor is concerned. 35 U.S.C.A. § 103.

[3] Patents ⇐16(3)
291k16(3) Most Cited Cases

When prior references are all in same or analogous fields, knowledge thereof by hypothetical person of ordinary skill is presumed, and test for patentability is whether teachings of prior art, taken as a whole, would have made obvious claimed invention. 35 U.S.C.A. § 103.

[4] Patents ⇐16(4)
291k16(4) Most Cited Cases

In determining whether prior references made obvious claimed invention, court may not simply engage in hindsight reconstruction of claimed invention, using applicant's structure as template and selecting elements from references to fill gaps; references themselves must provide some teaching whereby applicant's combination would have been obvious. 35 U.S.C.A. § 103.

[5] Patents ⇐16.30
291k16.30 Most Cited Cases

Denial of patent for composite candy sucker on stick, molded in elastomeric mold in shape of human thumb, on ground of obviousness, was sufficiently supported by evidence that various elements of claimed invention were shown in cited references in various subcombinations, used in same way, for same purpose as in claimed invention. 35 U.S.C.A. § 103.
***983** Thomas W. Tolpin, Highland Park, Ill., argued for appellant.

Teddy S. Gron, Associate Sol., Office of the Sol., Arlington, Va., argued for appellee. With him on the brief was Fred E. McKelvey, Sol.

Before RICH, NEWMAN, and RADER, Circuit Judges.

PAULINE NEWMAN, Circuit Judge.

Jeffrey B. Gorman and Marilyn Katz (hereinafter "Gorman") appeal the decision of the United States Patent and Trademark Office, Board of Patent Appeals and Interferences (the "Board") denying patentability to all the claims of Gorman's patent application Serial No. 06/882,480, entitled "Composite Food Product." We affirm.

The Invention

The claimed invention is a composite candy sucker on a stick, molded in an elastomeric mold in the shape of a human thumb. During the manufacturing process liquid candy is poured into the mold, and an edible plug of bubble or chewing gum or chocolate or food-grade wax is poured into the mold after the candy has hardened, serving as a seal for the end portion of the candy. A paper or plastic disc abuts and covers the plug. The mold serves as a cover that can be removed from the candy by means of protruding flanges. The cover is described as a "toy and novelty item".

Figure 1 shows the invention in the form in which it is marketed. Figure 2 shows the cover partially removed to reveal the candy portion (12) and the chewable or edible plug (58):

***984**

FIG. 1

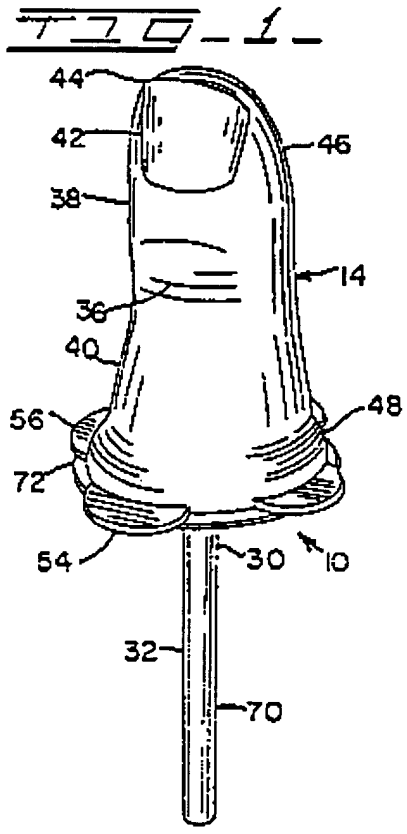
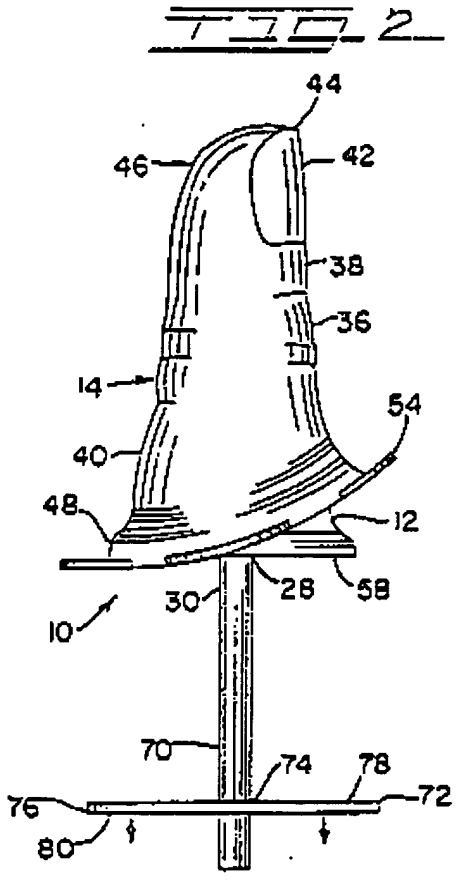


FIG. 2



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The claims describe the product in detail, as is apparent from claim 16, the claim pressed by Gorman in this appeal:

16. A composite food product, comprising:
a candy core, said candy core being in a generally liquified form when formulated, heated, blended and poured into a mold and in a substantially thumb-shaped hardened form when cooled and removed from said mold;
said thumb-shaped hardened form comprising said candy core positioned along a vertical axis and comprising a rigid joint-shaped portion, a rigid upper portion extending upwardly from said rigid joint-shaped portion along said vertical axis, and a rigid lower portion extending downwardly from said rigid joint-shaped portion along said vertical axis, said upper portion having a rigid finger nail-shaped portion with an upper rigid tip providing a rigid top end of said thumb-shaped hardened form and a rigid convex back extending rearwardly and downwardly from said rigid tip, and said rigid lower portion having a rigid bottom end and defining a recessed opening comprising a handle- receiving socket about said vertical axis;
a removable resilient shell comprising a substantially thumb-shaped, elastomeric material selected from the group consisting of rubber and flexible plastic, said shell providing
a mold for receiving and molding said liquified candy form,
***985** a removable outer protective cover positioned about and covering said hardened form comprising said candy core, and
a toy and novelty item for placement upon the thumb of the user when removed from said hardened form comprising said candy core;
said thumb-shaped elastomeric material comprising said removable resilient shell comprising a flexible joint-shaped portion, a flexible upper portion extending upwardly from said flexible joint-shaped portion along said vertical axis, and a flexible lower portion extending downwardly from said flexible joint-shaped portion along said vertical axis, said upper portion having a flexible finger nail-shaped portion with an upper flexible tip providing a flexible top end of said shell and a flexible convex back extending rearwardly and downwardly from said flexible tip, and said flexible lower portion having an enlarged open ended diverging base, said base having a larger circumference and transverse cross-sectional area than other portions of said shell and providing the bottom of said shell, said open ended based defining a plug- receiving chamber and an access opening for entrance of said liquified form and discharge of said hardened candy form, and a set of substantially symmetrical arcuate lobes extending radially outwardly from said base, said lobes being circumferentially spaced from each other and providing manually grippable flange portions to facilitate manual removal of said shell from said core;
a plug positioned in said plug-receiving chamber adjacent said bottom of said shell, said plug abutting against the bottom of said core and providing a cap for substantially plugging and sealing the open end of said mold and cover to help enclose said candy core, and said plug comprising a food grade material selected from the group consisting of bubble gum, chewing gum, chocolate, and food grade wax;
a handle having a connecting portion connected to said plug and said candy core and positioned in said plug-receiving opening and having a manually grippable handle portion extending downward from said connecting portion along said vertical axis; and
a substantially planar annular disk for abuttingly engaging and removably seating against said base and said lobes adjacent said plug, said disk defining a central axial hole for slidable receiving said handle portion and having an outer edge with a maximum span larger than said access opening but less than the maximum diameter of said symmetrical set of lobes to substantially minimize the interference with manually gripping of said manual grippable flange portions of said lobes, said disk being of a material selected from the group consisting of paper, paperboard, and plastic, and providing a removable closure member and seal for substantially closing said access opening and sealing said plug and said candy core within said shell.

The claims were rejected in view of thirteen references. The primary references, patents to Siciliano, Copeman, and Pooler, show ice cream or candy molded in a plastic, rubber or elastomeric mold. In Siciliano and Copeman the mold also serves as the product wrapper. In Siciliano the ice cream is poured into the mold, a stick is inserted, the ice cream is hardened, and a cardboard cover seals the area between the stick and the elastomeric

wrapper. Copeman and Kuhlke show candy lollipops molded in elastomeric molds. Copeman states that the mold may take "varying shapes, such as in the form of fruit, or animals" and Kuhlke discusses the desirability of sealing candy from the outside air. In Siciliano, Copeman and Kuhlke, the mold is peeled from the confection prior to use.

The two Nolte patents teach that gripping flanges may be placed on an ice cream wrapper to facilitate removal. Ahern and Knaust each show a disc-shaped seal or cover for a frozen confection. Ahern shows the cover in conjunction with ice cream on a stick.

Harris shows a hollow thumb-shaped lollipop into which the thumb is inserted, and ***986** Craddock shows a thumb-shaped confection supported on a disc-shaped handle; in both cases without the other elements shown by Gorman. Fulkerson shows a candy coating surrounding a block of ice cream, and a candy plug for retaining liquid syrup inside a cavity in the ice cream. Webster shows chewing gum entirely enclosing a liquid syrup product. Spiegel shows a chocolate layer having an alcohol diffusion barrier to plug the end of a plastic container of liqueur. Fulkerson, Webster and Spiegel all suggest the greater appeal to consumers of providing two different components in the same confection.

The Board found that all of the features of Gorman's product were known to the art, and that various combinations of these elements existed in known similar structures. The Board concluded that the applicant's claimed combination was suggested by and would have been obvious in light of the references.

Discussion

A

[1] Each element of the Gorman claims is in the prior art, separately or in sub-combination. Gorman argues that when it is necessary to combine the teachings of a large number of references in order to support a rejection for obviousness under 35 U.S.C. § 103, this of itself weighs against a holding of obviousness.

The criterion, however, is not the number of references, but what they would have meant to a person of ordinary skill in the field of the invention. In *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1383, 231 USPQ 81, 93 (Fed.Cir.1986), *cert. denied*, 480 U.S. 947, 107 S.Ct. 1606, 94 L.Ed.2d 792 (1987), the court held that a combination of about twenty references that "skirt[ed] all around" the claimed invention did not show obviousness. In other instances, on other facts, we have upheld reliance on a large number of references to show obviousness. Compare *In re Miller*, 159 F.2d 756, 758-59, 72 USPQ 512, 514-15 (CCPA 1947) (rejecting argument that the need for eight references for rejection supported patentability) with *Kansas Jack, Inc. v. Kuhn*, 719 F.2d 1144, 1149, 219 USPQ 857, 860 (Fed.Cir.1983) (where teachings relied upon to show obviousness were repeated in a number of references, the conclusion of obviousness was strengthened). *See also, e.g., In re Troiel*, 274 F.2d 944, 947, 124 USPQ 502, 504 (CCPA 1960) (rejecting appellant's argument that combining a large number of references to show obviousness was "farfetched and illogical").

[2][3] Determination of whether a new combination of known elements would have been obvious to one of ordinary skill depends on various factors, including whether the elements exist in "analogous art", that is, art that is reasonably pertinent to the problem with which the inventor is concerned. *In re Deminski*, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed.Cir.1986). When the references are all in the same or analogous fields, knowledge thereof by the hypothetical person of ordinary skill is presumed, *In re Sernaker*, 702 F.2d 989, 994, 217 USPQ 1, 5 (Fed.Cir.1983), and the test is whether the teachings of the prior art, taken as a whole, would have made obvious the claimed invention. *See In re Young*, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed.Cir.1991).

When it is necessary to select elements of various teachings in order to form the claimed invention, we ascertain whether there is any suggestion or motivation in the prior art to make the selection made by the applicant. *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed.Cir.1985). " 'Obviousness can not be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination.' " *In re Bond*, 910 F.2d 831, 834, 15

USPQ2d 1566, 1568 (Fed.Cir.1990) (quoting *Carella v. Starlight Archery and Pro Line Co.,* 804 F.2d 135, 140, 231 USPQ 644, 647 (Fed.Cir.1986)).

[4] The extent to which such suggestion must be explicit in, or may be fairly inferred from, the references, is decided on the facts of each case, in light of the prior ***987** art and its relationship to the applicant's invention. As in all determinations under 35 U.S.C. § 103, the decisionmaker must bring judgment to bear. It is impermissible, however, simply to engage in a hindsight reconstruction of the claimed invention, using the applicant's structure as a template and selecting elements from references to fill the gaps. *Interconnect Planning,* 774 F.2d at 1143, 227 USPQ at 551. The references themselves must provide some teaching whereby the applicant's combination would have been obvious.

B

Gorman argues that the references showing ice cream in a mold or wrapper on a stick and the references showing candy in a mold or wrapper on a stick are not analogous, for they require different conditions of production. However, the Copeman reference shows the close relationship of these arts, stating that his elastomeric mold may be used for "frozen confections and other solid confections". We conclude that the ice cream on a stick and candy on a stick arts are analogous, and that the Siciliano, Copeman, Pooler, and Kuhlke references show or suggest Gorman's candy on a stick and covered with an elastomeric mold, for which the thumb-shape is shown by Harris or Craddock.

The suggestion of providing a layer of chewing gum, chocolate or the like, surrounding the candy core in the area not covered by the mold, to seal the candy and provide a second food product, is provided by Fulkerson, Webster, or Spiegel. The paper disc adjacent the base of the candy structure is shown in Ahern and Knaust. Harris and Craddock both show thumb-shaped candy. Gorman argues that the prior art does not suggest using the thumb-shaped cover as a toy after the candy is removed. However, Copeman states that his rubber mold may be used as a "toy balloon" after the candy is removed. Gorman argues that Craddock teaches away from the claimed invention because of Craddock's admonition that lollipops on sticks are dangerous to children. However, candy on a stick is too well known for this caution to contribute to unobviousness.

Claim 16 recites details such as a "joint-shaped portion", a "finger nail portion", an "upper portion", a "lower portion" and a "convex back", as descriptive of the thumb shape. Such details are shown in the references and do not contribute to unobviousness. A claim that is narrowly and specifically drawn must nevertheless meet the requirements of § 103:

> The mere fact that a claim recites in detail all of the features of an invention (i.e., is a "picture claim") is never, in itself, justification for the allowance of such a claim.

Manual of Patent Examining Procedure, § 706 (Rev. 6, Oct. 1987) at pp. 700- 6; *In re Romito,* 289 F.2d 518, 129 USPQ 359 (CCPA 1961) (rejecting a "picture claim").

[5] Applying the principles of *Graham v. John Deere & Co.,* 383 U.S. 1, 17, 86 S.Ct. 684, 693, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966), we discern all of the elements of claim 16, used in substantially the same manner, in devices in the same field of endeavor. The various elements Gorman combined: the molded lollipop with a chewing gum plug, with the mold serving as the product wrapper; and candy in the shape of a thumb; are all shown in the cited references in various subcombinations, used in the same way, for the same purpose as in the claimed invention. The Board did not, as Gorman argues, pick and choose among isolated and inapplicable disclosures in the prior art. Rather, the claim elements appear in the prior art in the same configurations, serving the same functions, to achieve the results suggested in prior art. *In re Sernaker,* 702 F.2d at 994, 217 USPQ at 5. The large number of cited references does not negate the obviousness of the combination, for the prior art uses the various elements for the same purposes as they are used by appellants, making the claimed invention as a whole obvious in terms of 35 U.S.C. § 103.

The Board's decision is

AFFIRMED.

933 F.2d 982, 18 U.S.P.Q.2d 1885

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66 F.Supp. 1
70 U.S.P.Q. 485
(Cite as: 66 F.Supp. 1)

H

District Court, E.D. Missouri, Eastern Division.

KESLING
v.
GENERAL MOTORS CORPORATION.

No. 2308.

June 10, 1946.

Action by Elmer G. Kesling against General Motors Corporation for infringement of a patent.

Judgment for plaintiff in accordance with opinion.

West Headnotes

[1] Patents ⇐161
291k161 Most Cited Cases

In interpreting a patent it is first necessary to determine what contributions, if any, the inventor made to the prior art.

[2] Patents ⇐17(1)
291k17(1) Most Cited Cases

[2] Patents ⇐118.3(1)
291k118.3(1) Most Cited Cases
(Formerly 291k118.3, 291k118)

A patentee need not describe all possible embodiments of his invention, or know all the principles underlying it.

[3] Patents ⇐243(1)
291k243(1) Most Cited Cases

Where patentee has invented a new combination embodying a new principle of operation, and has claimed that combination without limitations as to details of elements making up the combination, infringement results when accused device embodies the combination regardless of changes or improvements in details of individual elements.

[4] Patents ⇐236(1)
291k236(1) Most Cited Cases
(Formerly 291k236)

Patent infringement results when accused mechanism attains substantially same result by substantially same or equivalent means operating and cooperating together in substantially the same way and such substantial identities must be sought for at level of contributions inventor has made to the art.

[5] Patents ⇐168(1)
291k168(1) Most Cited Cases

A patent is not limited by file wrapper estoppel where patentee is not attempting to broaden his claims to eliminate limitations therein, but is applying the claims, with all limitations contained in them to the accused construction.

[6] Patents ⇐172
291k172 Most Cited Cases

A patent need not be construed by injecting limitations into it to avoid infringement merely because it has not been embodied in commercial devices by the patentee, particularly where invention relates to industry requiring large capital.

[7] Patents ⇐26(1.1)
291k26(1.1) Most Cited Cases
(Formerly 291k26(11/4))

A novel combination of elements, not theretofore combined in same way by the prior art, may be patentable notwithstanding specific elements as such are disclosed in the art.

[8] Patents ⇐36.1(1)
291k36.1(1) Most Cited Cases
(Formerly 291k36(1))

Where elements of novel combination lay in the art for many years without being combined, and particularly where they were in part owned or controlled by defendant charged with infringement and where the result of combining them was being sought by the industry, the failure to combine them is evidence that the final combination was an inventive art.

[9] Patents ⇐17(3)
291k17(3) Most Cited Cases

Where prior art had been seeking for a successful

power shifter in automobile gears for over 20 years and had failed to find one, and inventor discovered a new principle that accounted for the failure and devised a new mechanical combination affording success, such new combination was inventive and not merely the work of an ordinary mechanic.

[10] Patents ⚿112.1
291k112.1 Most Cited Cases
(Formerly 291k112(3))

Where principal prior art relied upon by defendant was before the Patent Office during prosecution of application for patent involved, presumption of validity of patent was substantially strengthened.

[11] Patents ⚿233.1
291k233.1 Most Cited Cases
(Formerly 291k328)

Kesling patent, No. 2,034,400, claims 25-29, inclusive, relating to vacuum operated mechanism used in shifting automobile transmissions of selective sliding gear type, held valid and infringed.
***2** Lawrence C. Kingsland, Edmund C. Rogers, of Kingsland, Rogers & Ezell, all of St. Louis, Mo., for plaintiff.

Edwin E. Huffman, of St. Louis, Mo. Joseph Q. Stansfield, of New York City, and Edward S. Eveleth, of Detroit, Mich. (Horace Dawson and Edwin S. Booth, both of Chicago, Ill., and W. A. Gebhardt, of South Bend, Ind., of counsel), for defendant.

DUNCAN, District Judge.

This cause having come on for trial before the court upon the pleadings and the evidence adduced, and the court having seen and heard the evidence and having taken the matter under advisement, and being now fully advised in the premises, makes the following Findings of Fact and Conclusions of Law:

Findings of Fact

This is a suit at law for damages, brought by Elmer G. Kesling, a citizen of Missouri, against General Motors Corporation, a corporation of Delaware, having a place of business at St. Louis, Missouri, in this district, the suit charging infringement by General Motors of plaintiff's patent 2,034,400 by the vacuum booster mechanism sold by defendant on its Chevrolet automobiles. Defendant has sold automobiles embodying the accused mechanism in this district.

2. The parties have agreed that plaintiff has title to the patent in suit; and that, if the patent is valid and infringed, the amount of damages shall be at the rate of 12 cents per unit. Defendant's total sales of the accused mechanism aggregate 2,587,384 prior to the 1946 models; so that, if damages are payable, they are agreed to amount to $310,486.08.

3. The claims of plaintiff's patent in suit are numbers 26-29 inclusive.

4. The Kesling patent relates to a vacuum operated mechanism used in shifting automobile transmissions of the selective sliding gear type.

5. The conventional selective sliding gear automobile transmission, as used on most automobiles including the Chevrolet, comprises a group of gears interposed between the clutch of an automobile and the propeller shaft running to the differential and the rear axles. Its purpose is to provide different ratios of engine speed to driving wheels speed.

It conventionally has a driving shaft constantly geared to a countershaft and a reverse shaft, and a driven shaft variably engageable with the driving shaft by engagement of selected gears. There are two selectively movable gears, or gear equivalents. When one of them is moved forward, it makes engagement to establish direct drive between the driving and driven shafts for third or high speed. When it is moved backward, it makes another engagement for establishing second or intermediate speed. This first sliding gear is in axial alignment with the driving and driven shafts, and lends itself to combination with synchronizing clutches that synchronize the speeds of the teeth being meshed, to give easy engagement.

The second slidable gear is moved forwardly to make an engagement with a gear on the countershaft to establish first or low ratio. It is moved backwardly to make engagement with a gear on the reverse shaft to establish reverse speed. These

engagements are edge engagements of the sliding gear, with gears on parallel shafts, and they do not have any synchronizing clutches to facilitate the shifting.

In all transmissions of this type, there is a selector mechanism to hold against movement the one of the two sliding gears not being used at the time, and to permit movement of the one selected. There are various ways of doing this.

In all conventional selective sliding gear transmissions, the selection is made by the *3 movement of the hand lever across the bar of the H. Then the shift of the selected sliding gear is made by drawing the lever along one of the four projections of the legs of the H.

6. For many years automotive engineers had been attempting to find a power shift to perform gear shifting work. Apparently these devices were of doubtful mechanical value and did not attain extensive commercial use. Prior to Kesling, all such patents had taught an art dealing with exclusive power shifting means, and such patents taught control of the power by the actuator rather than of the gears assisted by power.

7. All of the numerous prior art shifters operated on the principle that the hand of the operator should control only a valve mechanism that monotored power to shifter devices. In all cases, from as early as 1912 to as late as the Moorhouse patent of Packard in 1932, this principle was employed. The actual shifting operation was performed entirely by power. Power thus applied was insensitive to the existence or absence of synchronization of the gears being meshed, and tended to force the gears together whether or not they were synchronized. This was likely to cause noise, and damage to gears.

8. In any engagement of sliding gears, there is a critical point occurring at the point of mesh of the gears being engaged. If a sliding gear is brought toward mesh with another gear that is out of synchronism, the edges of the teeth of the two will rattle together with a vibration. If the sliding gear is forced against the other gear, the noise will increase and damage to the mechanism may follow. Only when the gears are substantially synchronized may the engagement be made easily and without noise or damage.

9. Kesling, for the first time introduced a power shifter for sliding gears wherein the hand participated with the power in effecting the shifting. He embodied this in a mechanism having a hand lever, a vacuum power device, valve mechanism to control the power device, and shifter elements. All of the foregoing were known in the art. But Kesling combined these mechanisms through a composite central mechanism or actuator from which all of the four operating elements radiated and with which they were all connected. This actuator was a composite of members arranged to cause the hand lever and the power device to operate in a timed relationship. In the prior art, the power always led the hand so that there was only a power-produced gear movement at the critical point of mesh. In Kesling, this composite actuator assured that there would be manual domination through the first part of the shift which, in the terms of the art, means up through the point of mesh.

Thus Kesling's shifter by introducing the first shifter wherein the hand participated in the shifting operation afforded control through the first part of the shift up through the point of mesh, was the first to provide a mechanism for power shifting designed to force together unsynchronized gears without attendant noise, or likely to damage the mechanism in forcing together such unsynchronized gears, and yet wherein power could be employed to reduce the actual work or effort of shifting.

10. Underlying the Kesling combination of a central actuator from which the operating elements radiate is the principle that a successful power shifter may be made when the hand controls the operation up to or at the point of mesh. This principle marks a distinct advance from the prior art.

11. The Kesling patent illustrates one embodiment of the Kesling invention, wherein the hand lever, the valve, the power device, and the shifter elements all are grouped about a composite actuator having connections with all of them. In the illustration, the actuator comprises a shaft that is geared to the hand lever shaft, is geared to the power piston, is cammed to the valve mechanism, and is geared to the shifter elements. The arrangement is such that the hand starts a shifting operation by initiating movement of the actuator (as distinguished from the prior art wherein the hand initiates movement of the valve alone). The actuator is connected with the

shifter elements so that this initial movement of the actuator results in the application of a manual shifting force to the *4 gears. In due course, this movement of the actuator, through the connection of the actuator and the valve by the cam arrangement, opens the valve to admit power to assist in the shifting operation. This power is fully introduced in the latter part of the shifting operation-- i.e., after point of mesh-- so that there is no domination by power of the hand at the critical point.

The construction affords a continuous mechanical connection between the hand of the operator and the gears being shifted. By this, the operator may feel the gears into mesh. By the connection of the hand lever, as well as the power piston and valve to the actuator, the hand may control the shift at point of mesh and prevent a forced engagement of the gears.

Defendant contends, and I am convinced it is true, that the proportion of force exerted by power is about 80%, and the proportion of force exerted by the hand is about 20%. The combined forces of the two bring about movement of the shifter lever. The hand, in operating the shifter lever, is the dominant influence in the operation and without the control by the hand throughout the operation, the operation would not be carried on, i.e., the manual force dominates the mechanical force and whenever the movement of the hand stops, the operation in shifting the gears stops.

12. The real problem involved in the designing of a power shifter is to produce a shifter which efficiently shifts gears while reducing the manual effort required. A shifter would not be acceptable to the public and could not be sold if it did not reduce the hand effort below that of the ordinary manual shifter. Relieving the hand burden is the only reason for using power.

13. The foregoing illustration in the Kesling patent furnishes a basis for Kesling's claims of a novel combination of elements. This combination consists essentially of a hand operating means, a power operating means, a valve control, and shifter elements, all connected to a composite central actuator disposed centrally of the operating group. This combination, regardless of the details of the individual elements, marks a clear departure made by Kesling over the prior art.

14. The accused Chevrolet shifter consists of a hand lever, or shifter lever, a vacuum power device, a valve, shifter elements, and a composite linkage connected to all of them and disposed centrally of the group.

15. In the Chevrolet shifter, the valve and piston arrangement is of the follow-up type wherein an increment of valve movement is followed by an increment of piston movement which closes the valve. In this respect, the Chevrolet power mechanism, as such, differs from that illustrated by Kesling, the latter being a dump-valve operation. Both follow-up types and dump-valve types were known in the act.

16. The composite linkage of Chevrolet includes three levers, all permanently attached together and secured to a shaft. The shaft is connected to the shifter elements. The lever group is connected to the hand lever, the valve, and the piston also. The connections are such that the hand lever is at all times connected to the shifter elements, and affords a continuous mechanical connection between the hand of the operator and the gear being shifted.

17. The Chevrolet shifter affords a manual feel of the gears being meshed, and manual control of the sliding gear up to and at the point of mesh.

Defendant advertised the continuous mechanical connection between the hand and the gear being shifted as important features of its shifter.

18. Chevrolet adopted the principle shown by Kesling, that the hand must do part of the job of shifting in order to have a practical power shifting means. Chevrolet embodied this principle, in the novel combination disclosed by Kesling, of a composite actuator centrally disposed of and connected to the hand lever, the valve, the power piston, and the shifter elements.

19. An 'actuator' being something that actuates or puts into action or motion or incites to action, the composite linkage of the Chevrolet shifter is properly termed an 'actuator.'

20. Defendant contended that the Chevrolet composite linkage includes a valve lever that cannot be included as part of the *5 actuator. The so-called valve lever is operatively connected not

only to the valve, but also to the gear being shifted. It is an essential part of the composite actuator, all of the parts of which inter-operate to provide both power and manual action in making the shift. The valve lever cannot be disconnected from the other links of the actuator without destroying the entire shifter operation.

21. Kesling discloses the central composite actuator in combination with the four actuating elements of this combination wherein the hand controls the first part of the shift. The evidence supports the fact that to the transmission art, the division of a gear engaging operation is at point of mesh. Kesling clearly introduced into the art the manual control of the shift at this point. No shift of the prior art without this feature apparently was mechanically successful. And in this respect Kesling discloses that 'feel' would be present at the point of synchronization.

22. Defendant contended that the operations of the elements of the Kesling combination differed from those of the Chevrolet shifter. Such differences as exist are in details of the elements making up the Kesling combination. They largely involve details arising from the use of a follow-up valve system instead of a dumping-valve system. Both systems were known in the art. Selecting one or the other is a choice made after first adopting the Kesling combination. On the level of the Kesling contribution to the art, and the Kesling claims, they are equivalents.

23. The present claims are not limited by the art beyond the obvious meaning of their words. At this level, it is clear that the Chevrolet structure attains the same result-- a power-aided shift of sliding gears-- by substantially the same means-- a composite actuator centrally disposed with respect to the manual means, the power piston, the valve, and the shifter element-- the means cooperating in the same way-- by providing a continuous manual connection between the hand of the operator and the gear, as well as the valve, so that manual feel and manual control at point of mesh may be had.

24. Defendant contended that the Kesling claims were fully anticipated by the Moorhouse patent No. 1,993,015. This is not true because the Moorhouse patent discloses the old type of full power shift wherein, for all power shifts, the hand merely regulates the valve and does not participate in the work of shifting. Moorhouse does not have the central actuator from which all the four elements emanate to give any partial manual operation.

Furthermore, the Moorhouse patent, defendant's primary reference, was before the patent office in the file of the Kesling patent, and the claims in suit were allowed thereover.

25. Defendant contended that reaction linkage was old, and that it could be added to the Moorhouse structure without invention. The facts are that defendant's alleged reaction linkage was not in the transmission art, but in other arts, the patents referred to being Dewandre No. 1,869,956, Hallett No. 1,755,989, Albinson No. 1,846,017, Berry No. 1,865,817, and Eaton No. 1,938,745. There is no prior art showing of the Kesling combination. It was novel as a combination. It is not anticipated or rendered non-inventive by the presence of one or more elements in one or more different arts. Furthermore, the arts suggested did not present the problems of the transmission art, and clearly did not suggest to workers in that art the possibility that the Kesling combination could be made. Actually, these other patents were owned or controlled by General Motors or Bendix for years without having suggested the combination until after Kesling's disclosure.

26. The prior art emphasizes the long effort of the automotive industry to find a solution to the gear shifting problem. It shows a rather clear borderline. The prior art stopped with the full power shift. Kesling, for the first time, reached forth from the prior art, and by providing partial manual operation, offered a workable shift.

27. Defendant contended that Kesling's patent was a paper patent and should be narrowly construed. The Kesling invention ***6** of the new combination is not limited and should not be limited beyond its true worth in the art. Its worth is fully shown by defendant's use.

28. Defendant contended that the Kesling embodiment of the invention was not a desirable arrangement. This is debatable, but the embodiment is concededly operable, and it will perform the desired function of engaging gears by a combination of manual and power operation. The

changes made by Chevrolet are only changes made possible by the initial use of the Kesling novel combination.

29. It was beyond the skill of an ordinary mechanic to produce the new combination made by Kesling.

Conclusions of Law.

[1] I. In interpreting a patent, it is first necessary to determine what contributions, if any, the inventor made to the prior art. Kesling's patent must be interpreted on this level. The prior art, in this case, shows that Kesling made a new combination of elements for shifting gears.

[2] II. A patentee need not describe all possible embodiments of his invention, or know all of the principles underlying it. Here, Kesling set forth, in fully adequate terms, an embodiment he preferred, and one that will work. He claimed his invention as a new combination without limitation on the details of the individual elements making up that combination.

[3] III. Where a patentee has invented a new combination embodying a new principle of operation, and has claimed that combination without limitations as to the details of the elements making up the combination, infringement results when an accused device embodies the combination regardless of changes or improvements in the details of the individual elements.

[4] IV. Infringement results where, and only where, an accused mechanism attains substantially the same result by substantially the same or equivalent means operating and cooperating together in substantially the same way. These substantial identities must always be sought for at the level of the contribution the inventor has made to the art.

[5] V. A patent is not limited by file wrapper estoppel where the patentee is not attempting to broaden his claims to eliminate limitations therein, but rather is applying the claims, with all limitations contained in them, to the accused construction.

[6] VI. A patent need not be construed by injecting limitations into it to avoid infringement merely because it has not been embodied in commercial devices by the patentee. This is particularly true where the invention relates to an industry requiring such capital as does the automobile industry. Further, the incorporation of an invention into a successful infringing device cannot be overlooked.

[7] VII. A novel combination of elements, not theretofore combined in the same way by the prior art, may be patentable, even though specific elements, as such, are disclosed in the art.

[8] VIII. Where the elements of a novel combination lay in the art for many years without being combined, and particularly where they were in part owned or controlled by the defendant itself and where the result of combining them was being sought by the industry, the failure to combine them is evidence that the final combination was an inventive art.

[9] IX. Where the prior art had been seeking for a successful power shifter for over twenty years, and had failed to find one; where an inventor discovered a new principle that accounts for the failure, and devised a new mechanical combination that affords success, this new combination is inventive and not merely the work of an ordinary mechanic.

[10] X. Where the principal prior art relied upon by the defendant was before the patent office during the prosecution of the application for the patent in suit, the presumption of the validity of the patent is substantially strengthened.

[11] XI. The Kesling patent No. 2,034,400 as to claims 25-29 inclusive, is valid, and has been infringed by the defendant.

*7 XII. Plaintiff is entitled to his judgment prayed for, including his costs, and his damages in the stipulated amount.

66 F.Supp. 1, 70 U.S.P.Q. 485

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490 F.2d 981
180 U.S.P.Q. 580
(Cite as: 490 F.2d 981)

C
United States Court of Customs and Patent Appeals.

Application of Stephen F. ROYKA and Robert G. Martin.

Patent Appeal No. 9092.

Feb. 7, 1974.

Appeal from the decision of the Patent Office Board of Appeals affirming the examiner's rejection of patent application, Serial No. 648,701, for a 'responsive answer system.' The Court of Customs and Patent Appeals, Rich, J., held that an answer sheet for use in self-instruction and testing, in which were printed in 'response areas' meaningful information in permanent printing and confusing information in printing which could be removed, as by an erasure, both being legible so that a student, seeing a choice of answers to a question, was required to make a selection, the correctness of the selection being shown by the information which was then removed by the erasure, was not anticipated by prior patents and was therefore patentable.

Reversed.

West Headnotes

Patents ⚿66(1.20)
291k66(1.20) Most Cited Cases

"Responsive answer system," answer sheet for use in self-instruction and testing, in which were printed in "response areas" meaningful information in permanent printing and confusing information in printing which could be removed, as by erasure, both being legible so that student, seeing a choice of answers to question, was required to make selection, correctness of selection being shown by information which was then removed by erasure, was not anticipated by prior patents and was therefore patentable. 35 U.S.C.A. §§ 102, 103.

Patents ⚿328(2)
291k328(2) Most Cited Cases

3,055,117, 3,364,857. Cited.

Patents ⚿328(1)
291k328(1) Most Cited Cases

356,695. Cited.

***981** Michael H. Shanahan, Rochester, N.Y., of record, for appellant; Thomas M. Webster, Rochester, N.Y., Boris Haskell, Washington, D.C. (Paris, Haskell & Levine), Washington, D.C., of counsel.

Joseph F. Nakamura, Washington, D.C., for the Commissioner of Patents. Fred W. Sherling, Washington, D.C., of counsel.

Before MARKEY, Chief Judge, and RICH, BALDWIN, LANE and MILLER, judges.

RICH, Judge.

This appeal is from the decision of the Patent Office Board of Appeals affirming the examiner's rejection of claims 28 and 30-36 of application serial No. 648,701, filed June 26, 1967, entitled 'Responsive Answer System.' We reverse.

The Invention

The appealed claims are directed to a device in the nature of an answer sheet for use in self-instruction and testing. The answer sheet may be associated with questions or separate therefrom. The essential features of the invention are that there are printed on the answer sheet in 'response areas' meaningful information in permanent printing and confusing information in printing which can be removed, as by an eraser, both being legible so that a student, seeing a choice of answers to a question, must make a selection. Having made a selection, he then applies an eraser to the selected response area and some of the information will be readily removed. What remains advises him of the correctness or otherwise of his answer. The following figures from the drawings are illustrative:

490 F.2d 981
180 U.S.P.Q. 580
(Cite as: 490 F.2d 981)

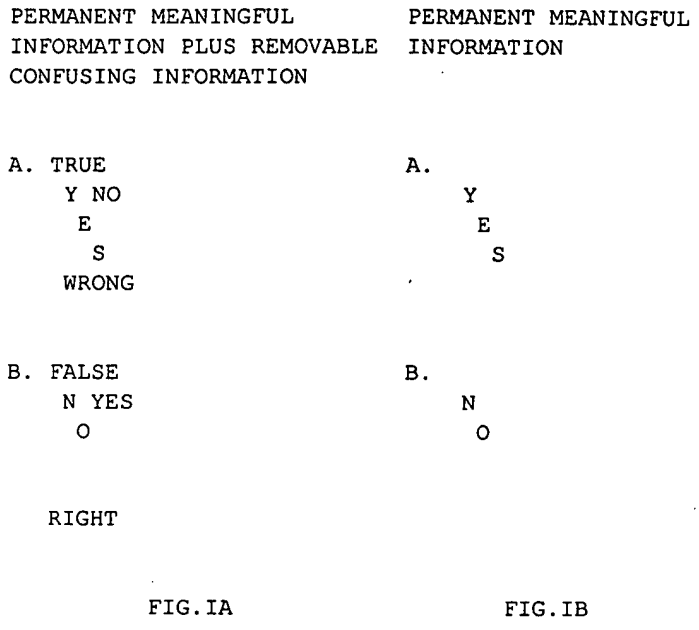


FIG.IA FIG.IB

Fig. 1A shows two response areas to a given question before any removing action ***982** by the student has taken place and Fig. 1B shows the permanent information remaining in each after erasure of the removable information. Of course, if the student makes an initial choice of area A, showing up 'YES' or some other indication of a correct answer, he will not need to proceed further and erase the B area. In a modified form of the invention, a wrong selection, plus erasure, may expose, instead of or in addition to a statement that the answer is wrong, a number or other reference to further material which is to be studied.

A preferred method of printing the permanent meaningful information and the removable confusing information is by that type of xerography in which a fusible toner is used, the permanence of the printing depending on the extent to which the toner image is 'fixed' or fused by heat. By successive printings of the two kinds of information with fixing to different degrees, one image can be made permanent and the other made subject to easy removal, both images retaining such similarity of appearance that the user of the answer sheet cannot tell them apart.

Claim 28 is the principal claim, all others being dependent thereon, and reads as follows:

28. A device for selectively indicating information comprising

a support having response areas for presenting information for selection,

permanent printing indicative of meaningful information permanently fixed to said support within a response area, and

removable printing indicative of confusing information removably fixed to said support within a response area,

said meaningful and confusing information being substantially legible even when said permanent and removable printing are fixed over one another on said support,

said permanent and removable printing being substantially similar such that an observer cannot determine which information is permanent and which is removable

whereby the information within a response area is selected by attempting to remove the printing therein with the failure to remove printing identifying meaningful information.

Claims 30-36 add limitations which need not be considered except for noting that claims 33 and 34 alone specify the use of a xerographic toner, for which reason they were rejected on a different ground from the other claims.

The Rejection

The following references were relied on:

Reid et al. (Reid)	356,695	Jan. 25, 1887
Bernstein et al. (Bernstein)	3,055,117	Sep. 25, 1962
Lein et al. (Lein)	3,364,857	Jan. 23, 1968 (filed Feb. 2, 1966)

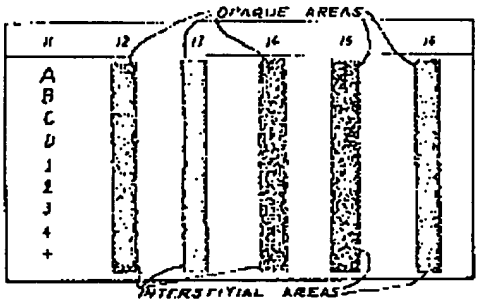
Claims 28, 30, 31, and 32 were rejected as anticipated under 35 U.S.C. § 102 by Bernstein; claims 28, 31, 32, 35, and 36 were rejected as anticipated under § 102 by Reid; and claims 33 and 34 were rejected under 35 U.S.C. § 103 for obviousness, on either Bernstein or Reid in view of Lein. These were the examiner's rejections and the board affirmed them, adhering to its decision on reconsideration.

Bernstein discloses an answer sheet in which printed information representing a response is 'temporarily concealed from the observer' and he discloses a number of different ways of effectively concealing the response. His specification states:

The objects of the invention are accomplished by utilizing the hiding media to confuse the participant and to render the response and the hiding media indistinguishable and thus conceal the presence, absence, nature or position of the response from the participant. This may be effectuated by careful attention being paid to a number of factors including the design, ***983** color and position of the hiding or confusing media.

Fig. 1 of Bernstein's drawings, illustrates some of his concealing means:

FIG. 1



The following is the written description:

Referring now to the drawing, FIG. 1 illustrates some of the many optically confusing patterns which may be positioned between the printed structure to be concealed and the point of observation. Column 11 shows the information which is to be concealed. This information is repeated in columns 12 through 16 but in each case is concealed by a pattern in accordance with the present invention. Column 12 utilizes a pattern comprising an alphabetical maze in both line and half tone screen. Column 13 utilizes a pattern comprising an absorbing field having a plurality of irregular dot-like interstices. Column 14 utilizes a

pattern comprising a maze of plus signs combined with dots. Columns 15 and 16 illustrate irregular and non-repetitious patterns.

Bernstein says that if at least 50% Of the response is actually covered by the opaque portions of the confusion pattern, complete concealment is obtained. He also says that added means of concealment may be used, such as scoring and embossing and perforating the paper in order to scatter the light or let it shine through.

Reid is entitled 'Transformation Picture and Print.' The invention is said to be useful for advertisements, Christmas cards, birthday cards, valentines, and the like and as a source of amusement and instruction for children. It consists of a picture or print, part of which is permanently printed and part of which is removable from the paper on which it is printed. For the latter various soluble undercoatings or inks are described. If the picture is washed with a solvent, which may be water, the removable part disappears and the pictorial and/or typographic matter changes. The invention is illustrated by a typical nineteenth century temperance propaganda piece depicting the evils of drink. In the finished picture there are three scenes from left to right: Scene 1, the innocent child leads her father home from the pub; Scene 2, Father sits slumped in the kitchen chair with his bottle beside him, the family wash hanging above his head, this picture being entitled 'The Effects of Drink'; Scene 3, Mother stands in front of a sign reading 'Pawn Shop.' Across the bottom of the picture is a legend which says 'Wash the above and see what water will do.' Fig. II shows the result of washing with water: Scene 1, a handsome young man and his happy daughter stroll on the street; Scene 2, Father sits erect in a well-appointed room at a clothcovered table, apparently having a cup of tea, obviously a gentleman; Scene 3, Mother beams from the sideline and the Pawn Shop sign has vanished. Two new subscriptions appear and the words 'The' and 'Drink' have disappeared, the resultant being a new picture title reading 'The Beneficial Effects of Temperance.' 'The Beneficial' and 'Temperance' were covered by some soluble opaque in the original picture. No doubt the overall effect is instruction. Perhaps there was amusement in bringing about the transformation.

Lein relates to xerography and is relied on only for its disclosure of the removability of partially fused toner and the permanence of fully fused toner.

OPINION

As to the § 102 anticipation rejections, it will suffice to consider independent claim 28. If it is not fully met by Reid ***984** or Bernstein, neither are the more limited dependent claims. It is elementary that to support an anticipation rejection, all elements of the claim must be found in the reference. We do not find claim 28 anticipated by Bernstein because, as we read the claim, it requires the display of legible meaningful and legible confusing information simultaneously, between which the user of the device may make a selection before he undertakes to remove any of the information from the response area selected by him. The element we find most clearly missing, contrary to the reasoning of the examiner and the board, is the legible confusing information. The Patent Office proposes to read this limitation on Bernstein's confusion patterns which are nothing but meaningless obscuring screens, conveying no information and providing the user with no basis for making a selection, as called for by claim 28. In appellants' device the legible confusing information-- i.e., the wrong answers-- are legible in the sense that they can be read as intelligible words, not merely a jumble of type serving to obscure the words of the wrong answers.

Appellants were fully aware of Bernstein and discussed its disclosures in their specification, distinguishing from this and other prior art, saying, in part:

The inventive concept hereof confuses not by physical blocking as taught by the prior art, but by compounding, associating (including disarranging) permanent information with confusing information, usually at least some of which is similar in character to the permanent information as to render it impossible to tell which is permanent and which is removable confusing information. In the invention, generally no attempt is made to designedly physically cover the permanent information, but to confuse it beyond interpretation by the presentation of extraneous removable, confusing information.

Claims are not to be read in a vacuum and while it is true they are to be given the broadest reasonable

interpretation during prosecution, their terms still have to be given the meaning called for by the specification of which they form a part. We cannot read the terms 'legible' and 'information' on Bernstein's confusion patterns, as did the examiner and the board. They are not 'legible,' as appellants use the term, and they convey no information.

As to anticipation by Reid, we find neither appellants' basic concept nor the substance of claim 28 to be disclosed. Apparently the solicitor could find little to support the rejection in Reid for all he says in his brief-- so far as claim 28 is concerned-- is:

Reid discloses a sheet which may be used for instruction and which may have a removable design partly covering a fixed design * * *. Therefore, the disclosure of the reference encompasses the arrangement wherein a removable design covers a fixed design with both designs being substantially legible.

But claim 28 does not call for an arrangement wherein a removable design covers a fixed design. It calls for response areas, which Reid does not have, containing meaningful information in permanent printing together with removable printing conveying confusing information, both legible at the same time, between which a 'selection' can be made. The only choice offered to the user by Reid is to follow the instruction to wash the whole visible picture with water or other solvent, thus removing the overprinting, to discover what the permanent picture is. The Patent Office attempt to read claim 28 on this reference is a tour deforce. We hold that Reid does not anticipate for failure to meet the limitations of claim 28 to 'response areas,' to the presentation of two categories of information (meaningful-permanent and removable-confusing) within such areas, and the possibility of selection. Anticipation requires a finding that the claimed invention be disclosed. It is not enough to say that appellants' invention and the reference are ***985** both usable for instruction and both consist of permanent and removable printings on paper, as did the solicitor.

The dependent claims rejected with claim 28, as anticipated under § 102, are not anticipated since claim 28 is not anticipated. Some of them merely add features which are disclosed by the references and some do not. Insofar as they do not, they further negative anticipation. The examiner recognized this fact as to claims 33 and 34, which are limited to xerography, and therefore did not reject them under § 102. Similarly, he did not reject claim 30 on Reid or claims 35 and 36 on Bernstein. We find that claims 35 and 36 contain limitations which additionally distinguish from Reid. We have already noted that Reid had no 'response areas' as required by claim 28 and so Reid does not disclose the structure of claim 35 which additionally requires both the correct and incorrect answers to appear within the same response area.

As to claim 36, the examiner said it 'is merely a printed matter variation of the design of the reference,' Reid. This is not a valid reason for rejection. Printed matter may very well constitute structural limitations upon which patentability can be predicated. We have commented on this matter In re Jones, 373 F.2d 1007, 54 CCPA 1218 (1967); and In re Miller, 418 F.2d 1392, 57 CCPA 809 (1969), and will not repeat ourselves. The limitations of claim 36 are not remotely suggested by Reid.

There remains the § 103 rejection of claims 33 and 34. Do they, taken together with all of the limitations of claim 28 from which they depend, define obvious subject matter? The difference between claim 28 and these two dependent claims is that they add the limitations to xerography. If Bernstein and Reid showed the claimed invention except for xerography, the addition of the Lein reference would make the subject matter of the claims obvious. But that is not the situation here. Adding the knowledge of xerographic technology to Bernstein or Reid still does not make the invention of claims 33 and 34 obvious for the same reasons we have given above in discussing anticipation. The essence of appellants' invention, as set forth in claim 28, is still missing notwithstanding the addition of the Lein reference and we see nothing in the combinations of references which would have made the invention obvious to one of ordinary skill in the art at the time it was made. We will, therefore, reverse this rejection.

The decision of the board is reversed.

Reversed.

490 F.2d 981
180 U.S.P.Q. 580
(Cite as: 490 F.2d 981)

490 F.2d 981, 180 U.S.P.Q. 580

END OF DOCUMENT

443 F.2d 1392
170 U.S.P.Q. 209
(Cite as: 58 C.C.P.A. 1310, 443 F.2d 1392)

C

United States Court of Customs and Patent Appeals.

Application of Gerald McLAUGHLIN.

Patent Appeal No. 8474.

June 24, 1971.

Patent applicant appealed from a decision of Patent Office Board of Appeals, Serial No. 566,701, sustaining rejection of three claims in application and allowing one claim. The Court of Customs and Patent Appeals, Baldwin, J., held that applicant's secondary evidence was adequate to rebut initial inference of obviousness with respect to claim 15 of application for patent relating to an improved construction arrangement for railroad boxcars which are adapted for carrying unitized cargo, requiring reversal of decision of Patent Office Board of Appeals with respect to that claim which it held unpatentable in view of the prior art, but as to claims 13 and 14 of application the prima facie case of obviousness made out by prior arts stood unrebutted and the Board's rejection of such claims must be sustained.

Decision affirmed as to claims 13 and 14 and reversed as to claim 15.

West Headnotes

[1] Patents ⇐51(1)
291k51(1) Most Cited Cases

Test for combining references is not what individual references themselves suggest but rather what combination of disclosures taken as a whole would suggest to one of ordinary skill in the art.

[2] Patents ⇐16(4)
291k16(4) Most Cited Cases
(Formerly 291k18)

While any judgment on obviousness is in sense necessarily a reconstruction based on hindsight reasoning, so long as judgment takes into account only knowledge which was within the level of ordinary skill at time claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such reconstruction is proper.

[3] Patents ⇐36(1)
291k36(1) Most Cited Cases
(Formerly 291k36(2))

[3] Patents ⇐36.2(1)
291k36.2(1) Most Cited Cases
(Formerly 291k36(1))

Inference of obviousness drawn from prior art disclosures is only prima facie justification for drawing ultimate legal conclusion that claimed invention is unpatentable, and it is imperative that such secondary consideration as commercial success be evaluated in determining final validity of conclusion even when claimed invention involves only a relatively simple mechanical concept. 35 U.S.C.A. § 103.

[4] Patents ⇐32
291k32 Most Cited Cases

Applicant's secondary evidence was adequate to rebut initial inference of obviousness with respect to claim 15 of application for patent relating to an improved construction arrangement for railroad boxcars which are adapted for carrying unitized cargo, requiring reversal of decision of Patent Office Board of Appeals with respect to that claim which it held unpatentable in view of the prior art, but as to claims 13 and 14 of application the prima facie case of obviousness made out by prior arts stood unrebutted and the Board's rejection of such claims must be sustained.

Patents ⇐328(2)
291k328(2) Most Cited Cases

3,217,664, 3,212,458, 3,163,130, 2,930,332. Cited.
****1393 *1310** Norman Lettvin, Chicago, Ill., attorney of record, for appellant.

S. Wm. Cochran, Washington, D.C., for the Commissioner of Patents; R. V. Lupo, Washington, D.C., of counsel.

Before RICH, ALMOND, BALDWIN and LANE, Judges, and RE, Judge, United States Customs Court, sitting by designation.

443 F.2d 1392
170 U.S.P.Q. 209
(Cite as: 58 C.C.P.A. 1310, 443 F.2d 1392)

BALDWIN, Judge.

McLaughlin has appealed from the decision of the Patent Office Board of Appeals sustaining the rejection of claims 13, 14 and 15 in his application [FN1] as unpatentable under 35 U.S.C. § 103 in view of the prior art. One claim has been held allowable.

FN1. Serial No. 566,701, filed July 5, 1966, for 'Compartment Arrangement for Railway Cars.'

THE INVENTION

The subject matter of the claims on appeal may be characterized as an improved construction arrangement for railroad 'boxcars' which ***1311** are adapted for carrying 'unitized' cargo. The latter term is defined by appellant as 'cargo that is loaded upon a cargo-handling platform (such as a pallet or slip sheet) of a pre-selected size, and which is arranged for transfer between stations by devices such as fork-lift trucks.'

Appellant states that prior art arrangements, having the doorways located substantially centrally in the opposed sidewalls, leave the center of the car unsuitable for holding additional pallets securely because side filler panels cannot be placed over the doorways without inconveniencing loading and unloading.

The present invention, as represented in Figure 2 of the application, which we reproduce below along with Figure 3, is alleged to permit a larger volume of freight to be conveniently loaded in a car with the same overall dimensions.

FIG.2

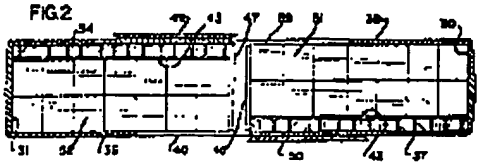
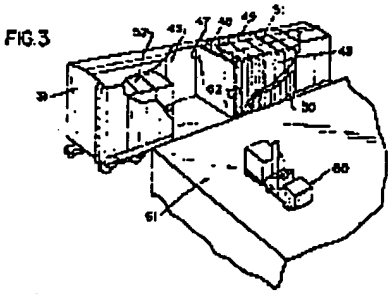


FIG.3



The car used in this arrangement has the door openings 39 (left hand occurrence) and 40 in the opposite sidewalls offset longitudinally so that each sidewall includes a long wall section and a short wall section on opposite sides of the opening. Side filler panels 43 and 45 are affixed to the interiors of the ****1394** long wall sections 37 and 34, respectively, and longitudinally adjustable bulkheads 47 and 48 are provided. ***1312** The car is shown completely filled with groups of palletized containers 51 and 52, secured in position by the side filler panels and bulkheads. The application describes the loading of this car as follows:

Typically, the load dividers 47 and 48 are initially moved to the left of doorway 40 to permit free access to the floor surface area in the 'deep end' of the car bounded by end wall 30. The pallets 51 are placed into the car in sequence, adjusting the side fillers to the necessary width required to firmly confine the pallets in place. During this time, door 49 is already closed to form the lateral support for the six pallet stacks 51 nearest load divider 48. The load divided 48 is then moved into position against the stacked pallets 51 and locked in place. The second load divider 47 is then temporarily positioned closely adjacent load divider 48 to permit free access to the 'short end' of the car terminated by end wall 31. Pallets 52 are then sequentially placed in position, adjusting the side fillers 45 to retain these pallets against lateral shifting. The three side fillers in the series 45 which are closest to the load divider 47 are preadjusted prior to loading the six pallet stacks 52 nearest load

divider 47. Finally, load divider 47 is moved into tight engagement with the stacked pallets 52, locked in place, and the door 50 is closed to secure the pallets 52.

The only independent claim on appeal is claim 13 which we reproduce as follows:

13. An improved car-loading construction for use in elongated, wallenclosed railway cars of the type utilizing therein longitudinally movable load-confining transverse bulkheads which are adapted to be located generally centrally of the ends of the car to project across substantially the entire width of the car;

said improved car-loading construction comprising, in combination,

the longitudinal side walls of the car each having a single doorway therein located between the ends of the wall to divide the wall into spaced long and short sections,

the doorways being offset toward different ends of the car so that the major portion of each doorway is directly opposite the long wall section of the opposing side wall, and

side filling panels mounted on the inside surface of each of said long wall sections and being adjustable toward and away from the corresponding long wall section, so that the transversely adjustable side filling panels on one long wall section and a longitudinally adjustable transverse bulkhead may cooperate to substantially fully enclose the load in one end of the car substantially to the mid-point of the car without adversely affecting the ability to load the other end of the car.

Claim 14 adds the additional limitations that the car is adapted to carry palletmounted loads and the lengths of the side walls of the car conform substantially to whole multiples of a dimension of a pallet. Claim 15 further provides that the portion of each doorway directly opposite a wall is 'substantially equal to a plural multiple of a dimension of the pallet' and that the rest of the doorway is narrower than a pallet dimension.

*1313 THE REJECTION

Claims 13, 14 and 15 were rejected as unpatentable over Cook [FN2] in view of either Robertson [FN3] and Aquino [FN4] or of Lundvall, [FN5] under 35 U.S.C. § 103.

FN2. Patent No. 2,930,332, granted March 29, 1960.

FN3. Patent No. 3,212,458, granted October 19, 1965.

FN4. Patent No. 3,217,664, granted November 16, 1965.

FN5. Patent No. 3,163,130, granted December 29, 1964.

Cook discloses a railway boxcar having sides defining oversized door openings **1395 in diagonally opposite ends of the car. That construction is described as facilitating loading and unloading lumber, permitting it to be palletized and to be handled by lift trucks.

Lundvall discloses a railway car provided with adjustable side filler panels for preventing lateral shifting of the load and adjustable bulkheads to hold the load against longitudinal shifting.

Robertson discloses a specific side filler panel construction for railway cars and Aquino is directed to a bulkhead construction for similar use.

The examiner and board based their holdings that the appealed claims are unpatentable on the view that persons of ordinary skill in the art would find it obvious to use bulkheads and side filler panels, as disclosed in the secondary references, in connection with loads placed in a car of the Cook construction.

OPINION

Appellant has strenuously urged that the reference disclosures were improperly combined. In particular, with regard to Cook, he argues that, while the reference does show elongated, longitudinally offset doors, it does not suggest such

an arrangement in combination with a bulkhead and side fillers because of the patentee's expressed desire to have a car capable of being loaded and unloaded simultaneously from both sides, which is not the desire of appellant nor even possible, he urges, with his arrangement.

[1][2] We have taken the above argument into consideration and do find that it has some merit. Nevertheless, it is not convincing. It should be too well settled now to require citation or discussion that the test for combining references is not what the individual references themselves suggest but rather what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. Any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made and does not include knowledge ***1314** gleaned only from applicant's disclosure, such a reconstruction is proper. The Cook patent does indicate that the car shown therein is suitable for carrying palletized loads with lift trucks being used for the loading and unloading, including stacking of the pallets. Since the secondary references show that it was well known to use side filler panels and bulkheads to confine palletized loads to prevent lateral and longitudinal shifting, we agree that those references would have suggested use of such panels and bulkheads with the Cook car for the same purpose.

[3] The foregoing conclusion in itself, however, is not determinative of the present appeal. Appellant has submitted evidence tending to prove that his invention has solved the longstanding problem of utilizing the maximum amount of space in standard, 50-ft. boxcars, permitting loading the car with 56 pallets of 48' X 40', whereas prior to the invention, cars of that size could be loaded with only 46 such pallets properly confined. The evidence, comprising two affidavits and a series of exhibits, indicates that the invention has been commercially successful and that its concept was promptly adapted by a competitor. Recognizing that the inference of obviousness drawn from the prior art disclosures is only prima facie justification for drawing the ultimate legal conclusion that the claimed invention is unpatentable under 35 U.S.C. § 103, it is imperative that such secondary considerations also be evaluated in determining the final validity of that legal conclusion. Graham v. John Deere Co., 383 U.S. 1, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966). We emphasize that such is true even where, as here, the claimed invention involves only relatively simple mechanical concepts. As we have said on another occasion: 'A patentable invention, ****1396** within the ambit of 35 U.S.C. § 103, may result even if the inventor has, in effect, merely combined features, old in the art, for their known purpose, without producing anything beyond the results inherent in their use.' In re Sponnoble, 56 CCPA 823, 405 F.2d 578, 56 CCPA 823 (1969).

The first affidavit was by appellant, himself, the manager of the Customer Relations Department of the Equipco division of Unarco Industries, Inc., the assignee of the application. He asserts that 355 railway cars equipped for use with his invention, valued at nearly eight million dollars, were ordered within little more than a year. Included with this affidavit are a series of reproductions of trade journal articles and advertisements tending to support the further assertion made in the affidavit, that the problem of effectively utilizing space was a familiar one. One exhibit is a copy of the advertisement of a competitor, tending to indicate that appellant's concept was adopted by that competitor. The other affidavit is by John Clement, general ***1315** traffic manager with the Corn Products Co. and apparently a disinterested third party. The affiant states that he has the duty of obtaining all the railroad and other types of cargo equipment necessary for shipping the company's products and that he became interested in the invention immediately upon its being disclosed to him because it appeared to solve problems presented by prior railway car arrangements, allowing use of substantially the entire cargo carrying capacity of the car while permitting truck loading. The affidavit further states that Corn Products had already received 10 cars possessing the proposed arrangement, had ordered 11 more and was negotiating for an additional forty.

The examiner did not consider the affidavits persuasive. That of Clement he characterized as alleging that appellant's arrangement is more versatile than prior arrangements without advancing any factual support. He regarded appellant's own affidavit as lacking sufficient facts to show that the asserted commercial success resulted from the invention as claimed. The board did not comment

on either affidavit in its opinion.

[4] Our own consideration of the affidavits in light of appellant's arguments convinces us that there was a problem in the art due to floor space in the mid-section of cars with side doorways not ordinarily being usable for palleted goods which require securing against transverse and lateral shifting. Moreover, the favorable opinion Clement expressed of the invention and the showing of extensive purchases of equipment for utilizing it indicate that appellant provided an unobvious solution of the problem. The affidavits reveal the solution as involving the arrangement substantially as described in applicant's application. Thus an arrangement is required wherein the relationship of the dimensions of the long and short wall sections and the door openings of the car are such that the pallets may be machine-loaded substantially to its full capacity. We note that these features are brought out fully only in claim 15 which recites that the long and short sections of the side walls are substantially equal to whole multiples of a dimension of a pallet and that the portions of the doorway directly opposite each other have a width equal to a plural multiple of a dimension of a pallet. As to that claim, we find appellant's secondary evidence adequate to rebut the initial inference of obviousness and, accordingly, reverse the decision of the board.

On the other hand, the affidavit showings do not demonstrate that an arrangement lacking any of the characteristics defined in claim 15 solved the previous space-utilization problem or that the commercial ***1316** success was due to less than all of those features. As to claims 13 and 14, thus, the prima facie case of obviousness made out by the prior art stands unrebutted and the board's decision ****1397** pertaining thereto must be sustained.

The decision of the board is affirmed as to claims 13 and 14 and reversed as to claim 15.

***1310** Modified.

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